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TRANSPORTATION REGIONAL ECONOMIC DEVELOPMENT

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THEODORE ROOSEVELT EXPRESSWAY

FINAL

April 2007

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Montana Department of Transportation

TRANSPORTATION REGIONAL ECONOMIC DEVELOPMENT

TRED

THEODORE ROOSEVELT EXPRESSWAY

April 14, 2007

The Montana Department of Transportation (MDT) launched the US 2 / MT 16 TRED Study in January 2006 to examine whether four-lane highway improvements to the Montana segment of the Theodore Roosevelt Expressway can be justified by economic, safety, regulatory, and other considerations. In completing this work, MDT consulted with state, federal, tribal, and local agencies, visited the area communities often, assembled an expert panel to inform our approach and conclusions, and requested and incorporated public input on drafts of this work. All the comments we received in the process have informed the document that follows. We at MDT are grateful for the interest and energy that so many have given to this project. The following report represents the final report of this work and its conclusions.

Thank you for your interest.

MDT

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Executive Summary

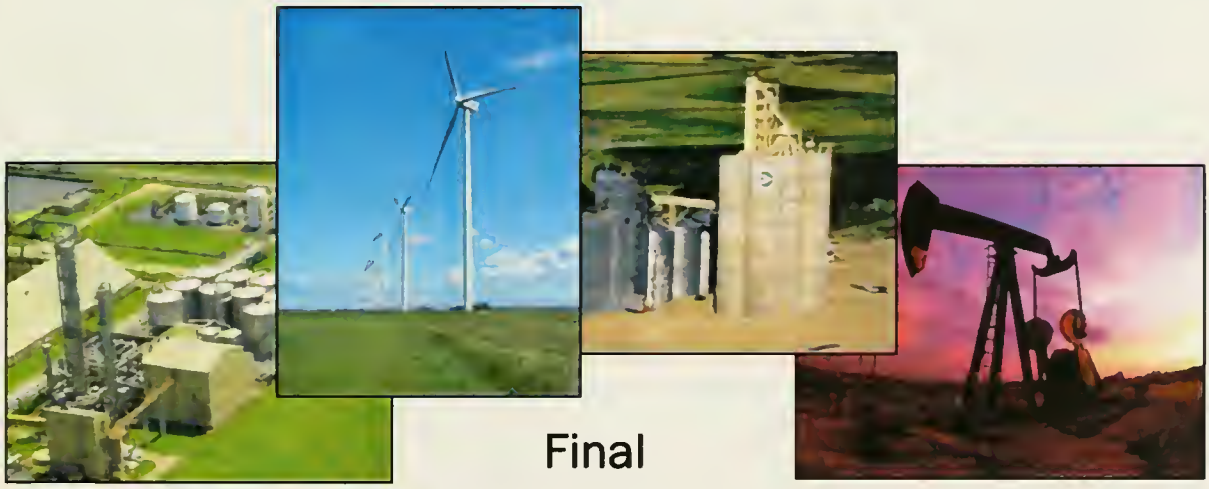
Montana Department of Transportation

TRANSPORTATION REGIONAL ECONOMIC DEVELOPMENT

TRED

THEODORE ROOSEVELT EXPRESSWAY

Executive Summary



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Prepared by:
HDR | HLB Decision Economics Inc.
8403 Colesville Road, Suite 910
Silver Spring, Maryland 20910

April 2007

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EXECUTIVE SUMMARY

BACKGROUND

The United States Congress designated the Theodore Roosevelt Expressway as a high priority corridor on the National Highway System in 2005 with the passage of the Safe, Accountable, & Flexible Transportation Equity Act-A Legacy for Users (SAFETEA-LU). The Theodore Roosevelt Expressway extends from the Port of Raymond, Montana at the Saskatchewan border in the north to Rapid City, South Dakota in the south. This corridor further connects to the Heartland Expressway that links Rapid City to Denver. The Heartland Expressway then links to the Ports to Plains Trade Corridor, which connects Denver, Colorado to Laredo, Texas. In total, the combination of all three of these designated corridors creates the Great Plains International Trade Corridor.

The portion of the Theodore Roosevelt Expressway that lies within the State of Montana, which is the focus of this study, consists of MT 16 from the Port of Raymond at the Saskatchewan border to Culbertson and US 2 from Culbertson to the North Dakota border. Given its strategic location, this corridor has received special attention at various levels in Montana, especially from those who view the US 2 segment of the corridor as a key segment in a new east-west corridor between Duluth, Minnesota and the west coast. However, previous efforts failed to justify a four-lane expansion of rural segments of US 2 in Montana but these efforts were based primarily on existing and future traffic and congestion levels and therefore could not demonstrate the necessary justification for anything other than an improved two-lane with passing lanes configuration.

It was within this context that this study was carried out. The study aimed at identifying economic, regulatory, or operational changes that would result in traffic and safety conditions which in its turn would warrant building a four-lane highway on the Montana portion of the Theodore Roosevelt Expressway.

PURPOSE OF THE STUDY

The primary purpose of the US 2/MT 16 TRED Study is to identify what economic, regulatory, or operational changes would result in traffic and safety conditions that would warrant building a four-lane roadway on the Theodore Roosevelt Expressway in Montana. Since this study recognizes that the corridor functions both as a freight corridor and as a local roadway, the study assesses current and future economic development potential at the local, regional, and national levels

This study is not a typical cost benefit analysis. Instead, this study presents quantitative and qualitative assessment of future conditions, traffic volumes, and safety performance along the study corridor that will assist Federal and State transportation planners in their decisions about future highway improvements along the corridor.

METHODOLOGY AND FRAMEWORK

The study uses sound economic theory to assess present and future traffic conditions in the corridor based on an analysis of sector level data, trade forecasts, and future planning at the local and regional levels. In particular, to provide a comprehensive assessment of the regional economy and the implications of the study corridor, this study relies on the following:

1. A detailed analysis of various demographic, socioeconomic, sectors level (agriculture, energy, tourism, etc.), and trade data at the local, regional, and national level;

2. Interviews of representatives of over 120 key agencies, corporations, and institutions in the region;

3. Interviews of key transportation planning agencies from neighboring states and provinces;

4. A methodology that considers growth *incrementally* by estimating the growth under existing infrastructure conditions and then assessing additional growth that can be attributable to capacity expansion;

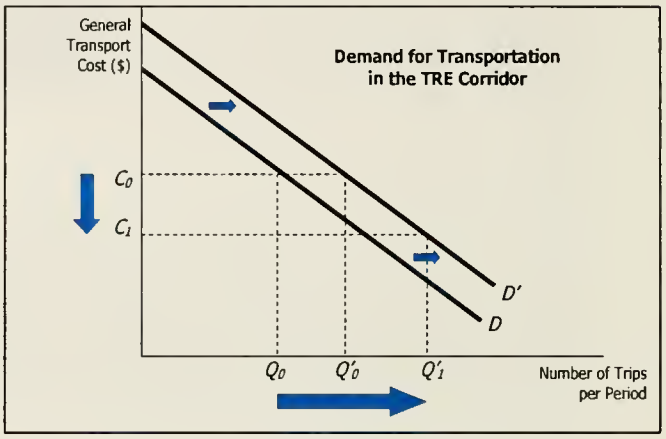
5. A probabilistic expression of all assumptions to account for uncertainty;

6. Involvement of the public, resource agencies, and local communities; and

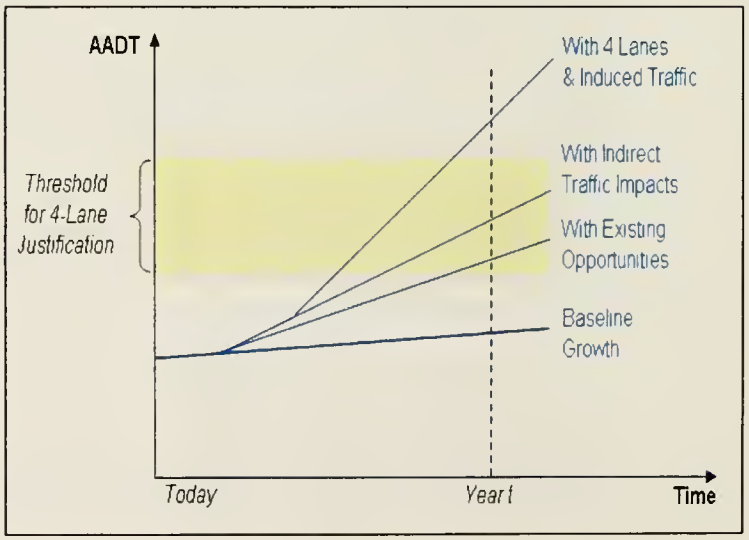
7. Continuous involvement of a panel of experts and stakeholders to provide transparency and credibility to the process.

The study framework includes a two-step assessment, as illustrated in the exhibit below:

- Impact of current development opportunities on the demand for transport: This leads to higher demand with no changes in cost (shift in the demand curve from *D* to *D')*
- Impact of future infrastructure improvements: reduction in the general cost of transport (*C0* to *C1)* resulting in higher number of trips (Q'_1).



The approach therefore ensures incrementality by isolating economic development potential from four-lane expansion by taking into account various opportunities that may be realized under current infrastructure conditions. The exhibit on the right illustrates the process to isolate the impact of four-lane expansion on traffic levels while taking into account a sequence of impacts, namely:



- Baseline historical traffic counts

- Baseline forecasts (assuming continuation of historical growth rates)
- Changes in traffic from various itemized economic opportunities
- Indirect traffic impacts of existing opportunities
- Induced demand resulting from four-lane expansion

DATA GATHERING & DUE DILIGENCE

The study effort included a comprehensive data gathering and analysis process to assess current and future opportunities for the region:

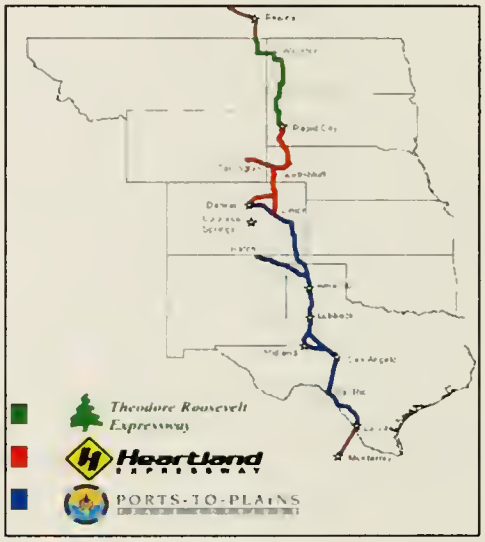
- Review of all existing studies, documentations, surveys, and forecast;
- Interviews of over 120 government officials, economic development experts, academic experts, private business leaders, and other stakeholders in the region to inform a forecast of future highway demands;
- Survey of ten transportation departments about their future capacity expansion plans (Colorado, Idaho, Minnesota, Nebraska, North Dakota, Oklahoma, Saskatchewan, South Dakota, Texas, and Washington);
- Accounting for uncertainty of projected demand by using risk analysis when forecasting traffic under various scenarios;
- Several meetings with an expert panel to provide input and validation for key variables and assumptions; and
- Gathering additional information and comments through local public meetings and communication with resource agencies.

KEY FINDINGS

The study results can be categorized into three key findings related to the study corridor's function as part of the Theodore Roosevelt Expressway.

1. Ensuring continuity of design of the study corridor with adjoining segments of the Theodore Roosevelt Expressway is important for future development of the corridor and its surrounding area.
2. The corridor is increasingly becoming and will continue to be a significant freight corridor with a high percentage of truck traffic that must move at a slower speed than other traffic. A four-lane configuration is expected to provide a safer corridor than two-lane configurations, especially during high traffic periods. While considerable, these positive safety effects are not alone sufficient to warrant a four lane design.
3. While traffic is not expected to increase significantly, the region is expected to experience strong growth in the energy, agriculture, and tourism sectors. These opportunities will have a higher likelihood of materializing under four-lane conditions than under two-lane conditions. While considerable, these positive traffic effects are not alone sufficient to warrant a four lane design.

Four Lane Continuity and Regional Interconnectivity



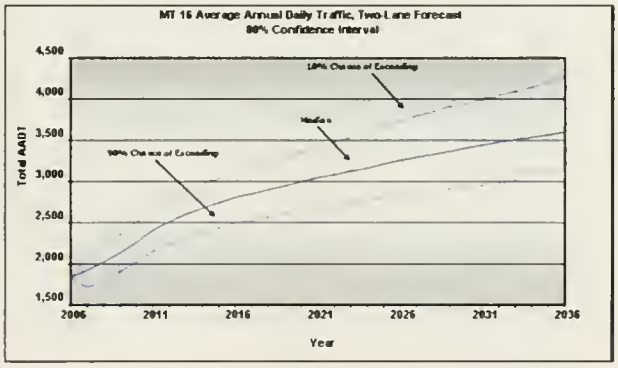
The study findings revealed that the area shares many similarities with adjacent states and provinces that extend beyond political borders. The broader region is largely comprised of a comparable agriculture-based economy that is experiencing rapid expansion in the energy sector, and shares similar historical and cultural heritage. Owing to the rural character of the region and lack of larger trade centers in it, regional consumer trade and work-related traffic appears to flow quite readily across boundaries. Williston, North Dakota (pop. 12,200) is the nearest higher-order trade center to this part of Montana. Residents commonly travel interstate for consumer purchasing. Professional and financial services, too, are relatively concentrated in Williston, suggesting its central function for these services. Among major-order trade centers, Regina, Saskatchewan is by far the closest to the study region. If travel conditions improve, travel across the state and international borders can be expected to grow. The study survey also found that some neighboring states, including North Dakota, are progressing toward four-lane expansion of portions of the Theodore Roosevelt Expressway. In particular, NDDOT indicated that, while not having current plans relating to the US 85 segment of the TRE, NDDOT would advance to developing a project for a four lane road to the state border if Montana does so. Moreover, NDDOT and MDT are mutually disposed to coordinate efforts

on future phases of improvements to the TRE corridor. Based on qualitative interviews the study also found that transportation system continuity is critical from four main perspectives:

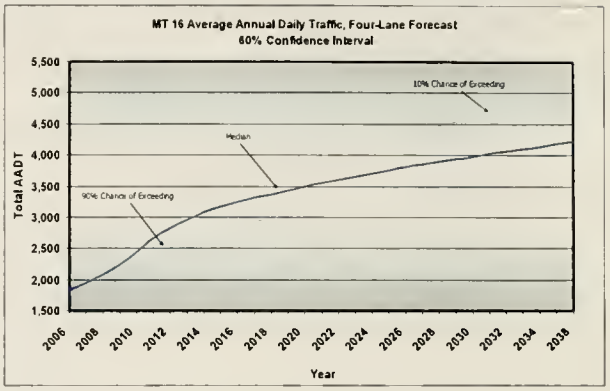
- Strategic: Four-lane continuity ensures speed, safety, and consistent design through the northern TRE corridor by linking to a planned four-lane extension of US 2, west of Williston, ND to the Montana border. When completed, a four-lane US 2 will extend to Williston, then east through North Dakota and into Minnesota. Given unused capacity at the Port of Raymond and the growth of the region, four-lane continuity would strategically position the TRE corridor as a freight corridor and as a NAFTA corridor that handles long term growth.
- Competitiveness: Four-lane continuity positions the corridor as a true alternative, and therefore a competitor, to other highways in the region. The competitiveness of the corridor will be reflected in induced traffic demand and eventually increasing economic development. Furthermore, the analysis found that the level of service in the corridor will continue to be good, making it an increasingly attractive alternative as other highways and ports, such as the Port of Portal, experience more congestion. This increased competitiveness can allow the corridor to function both as a north-south segment and as a link between east and west regions.
- User Perception: Four-lane continuity would play a significant role in driver perceptions. Research in road pricing showed that a driver's choice of a route is based more on the perceived level of service rather than the actual level of service. Accordingly, through stakeholder interviews, the study found that many perceived the existing roadway as less safe than the data shows and that they think a four-lane roadway would provide safer travel and a better level of service for both personal vehicles and truck traffic. This perception should lead truck dispatchers as well as logistics and supply chain managers to make an improved corridor the route of choice for their long-haul trucks in the region.
- Design Continuity: Four-lane continuity will also ensure design continuity and therefore a synergistic effect on traffic and freight growth along the corridor.

Traffic Conditions and Level of Service

The study relied on a bottom-up approach to assess traffic conditions and the level of service estimated in terms of congestion related to roadway capacity. The assessment included both current conditions and any future opportunities or threats in the region.

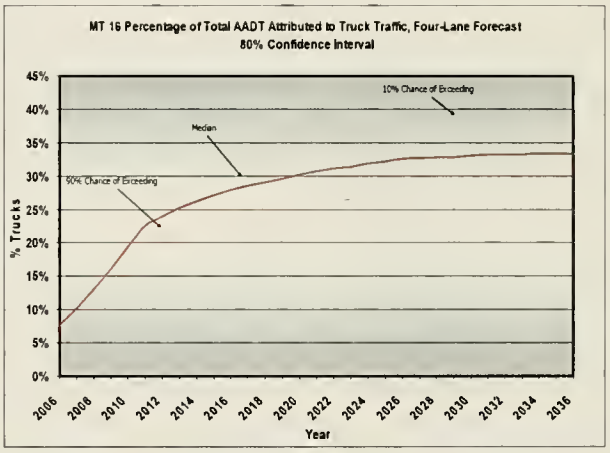


The analysis included a survey of representatives of industries in the region as well as the involvement of experts to validate the likelihood and effects of short term and long term plans in the region under various infrastructure scenarios. The analysis also incorporated risk analysis to account for uncertainty in key assumptions given various market conditions and their impact on the region.



For the analysis of level of service conditions on the study corridor, the corridor was divided into three segments: MT 16 from the Port of Raymond to Plentywood, MT 16 from Plentywood to Culbertson, and US 2 from Culbertson to the North Dakota State line.

The analysis was conducted on both the existing conditions and four-lane. While the future forecast traffic volumes were not large enough on their own to justify four-lane configurations, the analysis revealed that some opportunities are more likely to be realized under the four-lane scenario than the two-lane scenario which would result in higher traffic volumes. The figures on the right show the MT 16 segment under the two scenarios. The other two segments of the study corridor follow the same pattern.



The analysis summarized in the table to the right shows that each segment of the study corridor would meet the guidelines of LOS "B" for this type of facility with a two-lane configuration. The forecasted change from LOS A to LOS B means the time spent following trucks and other vehicles is expected to increase by up to 15% which could decrease travel speeds by 5 miles per hour on average.

Segment	MDT LOS Guidelines	2007 LOS	2037 LOS
MT 16 from Port of Raymond to Plentywood	B	A	B
MT 16 from Plentywood to Culbertson	B	A	B
US 2 from Culbertson to the ND State line	B	A	B

Safety Conditions

The study findings indicate that while the average daily traffic on the MT 16 and US 2 sections of the corridor are projected to double over the next 30 years with the existing infrastructure, the percentage of trucks in the overall traffic is expected to increase from under 10 percent today to approximately 30 percent. This percentage is slightly higher under the four-lane scenario.

The study included an extensive investigation of the safety benefits of a rural four-lane roadway versus a rural two-lane roadway. While no directly comparable routes were found, studies from other states showed the safety performance of two-lane segments tends to improve when expanded to four-lanes. Other studies also show that two-lane roadways with a higher percentage of truck traffic in rural areas exhibit a poorer safety performance than four-lane roadways.

Roadway Segment	Description	Segment AADT	Percent Trucks	Overall Crash Rate	Truck Crash Rate	Overall Severity Rate
N-1 (US 2)	Culbertson to North Dakota Border	1184	10.60%	1.52	1.14	3.6
N-34 (MT 16)	Saskatchewan Border to Plentywood	736	12.60%	0.24	0.78	0.77
N-22 (MT 16)	Plentywood to Culbertson	1093	13.50%	0.9	0.93	1.92
N-1 (US 2)	US-2 Havre to Fort Belknap	2727	8.70%	1.27	1.13	2.54
N-62 (MT 16)	Culbertson to Sidney	1142	12.10%	0.91	1	1.56
N-1 (US 2)	West of Shelby to Culbertson	1724	9.60%	1.06	0.85	2.3
N-53 (MT 3)	Billings to Lavina	2181	13.00%	0.69	0.76	1.42
N-14(MT 3)	Harlowton to Lavina	1554	19.10%	0.95	0.55	1.86
N-8 (US 12) 4 lane	Helena to bottom of MacDonald Pass	3944	9.00%	2.07	0.93	2.75
N-14 (MT 3)4 lane w/ TWLTL	Great Falls to Jct. S227/S228	6202	9.40%	1.34	0.9	3.77

The MT 16 and US 2 sections of the study corridor within Montana are governed by dual statutory speed limits; one limit for large trucks and a 10 mph higher limit for passenger vehicles. Some stakeholders interviewed for this study view this disparity in speed limits as an inherent unsafe driving environment which may be exacerbated by increasing truck traffic on the corridor.

The study included an analysis of Montana crash data for the MT 16 and US 2 sections of the study corridor and other comparable rural two-lane roadways with similar traffic volumes and a large percentage of trucks. This analysis found the highest crash and severity rates on US 2 between Culbertson and the North Dakota state line.

Environmental Impacts

This study includes an analysis of environmental issues in the study area that could influence future highway improvements. This analysis, as documented in the "Environmental Scan", identified relatively few potential environmental issues along the corridor. However, based on a review of aerial photographs of communities along the corridor, there would be some impacts to commercial and

residential properties with four-lane undivided improvement configurations. These impacts would have to be addressed in the development of future projects.

CONCLUSIONS

- Economic development may increase incrementally if the highway infrastructure in the study corridor expands from a two-lane to four-lane facility.

- Opportunities related to the agriculture and energy sectors in the region have a higher likelihood of being realized with four-lane configurations than with two-lane configurations.

- An improved two-lane configuration would provide a reasonably adequate future level of service but would not address system continuity issues.

- Four-lane continuity with adjoining segments of the Theodore Roosevelt Expressway would provide regional interconnectivity by better positioning the corridor from the strategic, competitive, user expectation, and design continuity perspectives.

- With the estimated future 30% in truck traffic and associated speed differential, a four-lane facility will help address passing conflicts on the study corridor.

- US 2 from Culbertson to the North Dakota state line has crash and severity rates that exceed statewide averages. Although improved two-lane improvements would improve safety, four-lane improvements would provide additional incremental benefits.

- As the corridor approaches the design year, the existing two-lane configuration will approach Level of Service "C" conditions. Four-lane configurations would maintain a higher Level of Service for a longer period.

Potential Next Steps: Preliminary MDT Assessment

Decisions about the scope of future highway improvements to the study corridor are the responsibility of the Montana Department of Transportation with approvals necessary from the Federal Highway Administration and Federal and State resource agencies. Based on the draft results of the US 2/MT 16 TRED Study, the following could provide the basis for decisions regarding the purpose and need and lane configurations for future improvements to the corridor.

Primary purposes for future improvements:

- Provide system continuity and roadway consistency with adjoining segments of the Theodore Roosevelt Expressway.
- Enhance the function of US 2 and MT 16 as part of a high priority corridor by improving travel conditions for long distance interstate and intrastate and international freight movement.
- Support economic growth in the multi-jurisdictional area.
- Improve the safety of the corridor.
- Address roadway design deficiencies to meet current MDT standards.

Following is an evaluation of potential highway improvement alternatives for the study corridor based on their relationship to the above purposes:

- **Improved Two-Lane Highway** - Two travel 12 foot travel lanes with eight foot shoulders (in urban areas curb, gutter and sidewalk would be provided)
- **Improved Two-Lane with Passing Lanes Highway** – Two travel 12 foot travel lanes with eight foot shoulders (in urban areas curb, gutter and sidewalk would be provided). In passing lane areas an additional 12 foot travel lane would be provided.
- **Four-Lane Undivided Highway** – Four 12 foot travel lanes with eight foot shoulders (in urban areas curb, gutter and sidewalk would be provided).
- **Four-Lane Divided Highway** – Four 12 foot travel lanes, eight foot shoulders and a 35 foot median (in urban areas the median would be eliminated and curb, gutter and sidewalk would be provided)

Note: All alternatives assume use of the existing highway alignment including through communities due to Montana law that prohibits MDT from bypassing incorporated cities without the approval of the local government.

In the following table, improvement alternatives were evaluated against the improvement purposes. As shown, only the four-lane alternatives meet all of the improvement purposes. The improvement of the Theodore Roosevelt Expressway corridor in Montana to four-lane divided standards would address the maximum number of improvement purposes and the improved two-lane alternative would address the minimum number of improvement purposes.

US 2/MT 16 TRED Corridor Improvement Alternative Evaluation Summary

	Improvement Alternatives			
Improvement Purpose	**Improved Two-Lane**	**Improved Two-Lane with Passing Lanes**	**Four-Lane Undivided**	**Four-Lane Divided**
Provide system continuity and roadway consistency with adjoining segments of the Theodore Roosevelt Expressway.			√	√+
Enhance the function of US 2 and MT 16 as part of a high priority corridor by improving travel conditions for long distance interstate and intrastate and international freight movement.	√	√	√+	√+
Support economic growth in the multi-jurisdictional area.	√	√	√+	√+
Improve the safety of the corridor	√	√+	√+	√++
Address roadway design deficiencies to meet current MDT standards.	√	√	√	√

Cost Estimates and Financial Considerations

As shown in Appendix A of Summary & Conclusions, construction cost estimates for two-lane and four-lane design configurations for the study corridor range from $179 million to $319 million. MDT has reserved $2 million from a SAFETEA-LU earmark to move forward into next steps on US 2 if the US 2/MT 16 TRED Study justifies reconsideration of planned improvements on the Theodore Roosevelt Expressway corridor. If reconsideration is justified, the non-federal match is approximately $310,000. MDT review of project design and planning workloads concludes that the project would not jeopardize any future highway project.

Working Paper #1:
Assessment of Existing Conditions

Montana Department of Transportation

TRANSPORTATION REGIONAL ECONOMIC DEVELOPMENT

TRED

THEODORE ROOSEVELT EXPRESSWAY

Working Paper #1: Assessment of Existing Conditions

Final

Prepared by:
HDR | HLB Decision Economics Inc.

8403 Colesville Road, Suite 910
Silver Spring, Maryland 20910
Tel: (240) 485-2600
Fax: (240) 485-2635

April 2007

DISCLAIMER

Some of the claims and conclusions presented in this report are based on interviews conducted by the research team between May and July 2006. Whenever possible, data and technical analysis are provided in the report to substantiate these claims. When no data or analysis is provided, please remember that further analysis is necessary to determine whether the claim, or conclusion, is supported by the facts.

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1: INTRODUCTION

This Working Paper is a part of the US 2/MT 16 Transportation Regional Economic Development (TRED) Study. The primary objective of the TRED Study is to identify what economic, regulatory, or operational changes would result in traffic and safety conditions that would warrant building a four-lane roadway on the Theodore Roosevelt Expressway in Montana. As with any study, there is a process by which the determination of this objective must be evaluated and a judgment made as to its feasibility. This report is part of a methodical approach to determine the primary study objective. This report details the existing economic and roadway conditions within the corridor study area in Montana, as well as additional data and information about what is happening in the region and along the TRE through North Dakota and South Dakota to Rapid City. This information is being used to develop a baseline condition for assessment based upon the study scope.

Congress named the Theodore Roosevelt Expressway (TRE) as a National Highway System High Priority Corridor in the Safe, Accountable, Flexible, & Efficient Transportation Efficiency Act-A Legacy for Users (SAFETEA-LU). This corridor begins at the Port of Raymond, Montana and connects to the Heartland Expressway that links Rapid City, South Dakota to Denver, Colorado. The Heartland Expressway links to the Ports to Plains Trade Corridor, which connects Denver to Laredo, Texas. In total, the compilation of all three of these designated corridors creates the Great Plains International Trade Corridor, linking Canada, the United States, and Mexico. The TRE is one of three such corridors that have been designated through Montana.

The US Highway 2 section of the study corridor has special significance due to calls to widen all of the nearly 700 miles of US 2 in Montana to four lanes to spur economic development and enhance safety, particularly in Eastern Montana. Proponents of this effort see a four-lane US 2 as a key segment in a new east-west corridor between Duluth, Minnesota and the West Coast. However, previous examinations of improving a rural section of US 2 resulted in selection of an improved two-lane facility with passing lanes over a four-lane configuration. This decision was based on analyzing the different lane configurations and weighing, among other things, projected traffic volumes and existing economic development plans against the impacts and benefits realized from the highway improvements. The two-lane with passing lane configuration was selected by the Federal Highway Administration as best meeting the purpose and needs of the proposed improvements as required by the National Environmental Policy Act (NEPA). Compliance with NEPA is mandatory to use Federal funds in highway projects.

The inclusion of a portion of US 2 in the Theodore Roosevelt Expressway provided the Montana Department of Transportation (MDT) with an opportunity to take a broader look at the corridor in the context of a pre-NEPA planning effort that can look at local, regional, national, and international developments, such as the TRE designation, that may increase future traffic volumes on the study corridor beyond what normal forecasting methods would predict.

One of the first steps of the study's approach is an overview of the existing economic environment in the region, in order to provide comments and an initial assessment of the existing

highway infrastructure conditions and their impact on the local economy. This Working Paper presents the results of that research.

The research utilizes a combination of state-level, county-level (for counties included in the 6-county study area), and Provincial data on population and population trends, employment, industrial structure and output, commodity flows, traffic conditions, as well as results of other related studies.

Section 2 of this paper presents a socio-economic overview of the study area. Section 3 discusses transportation characteristics and performance in terms of traffic, commodity flows, and industry demand for transportation services. Section 4 provides an overview of existing conditions in regions adjacent to the study area. Finally, Section 5 summarizes and concludes the analysis. The appendix provides supporting material used as well as an annotated bibliography of the materials and data sources used.

2: OVERVIEW OF THE STUDY AREA

This section provides a general overview of currently planned projects in the state, defines the study area, and assesses trends in its population and general economic conditions.

2.1 Definition of the Study Area

There are two primary highway segments that define the study area: US 2 from the North Dakota State line to Culbertson, and MT 16 from Culbertson at the intersection with US 2 to the Port of Raymond at the Canadian Border. The two highways have similar characteristics. They are both rural, two-lane highways with approximately 4 to 5 foot shoulders. The pavement is in good condition throughout. The primary difference is that, within the study area, MT 16 has approximately one third less traffic than US 2, with the exception of traffic in the Plentywood area.

MT 16 doubles its traffic levels in and around Plentywood. This is due to the trip-generation characteristics of the businesses in Plentywood and Scobey. These communities combine to create a small but stable, rural, agrarian economy that generates additional traffic in the Plentywood area. As the highway turns north toward the Canadian border, traffic volumes again fall to same level as those south of Plentywood.

Planned projects on the study corridor include the Bainville East & West Project on US 2, which will replace a narrow two-lane highway that was last reconstructed in 1955 with a wide two-lane highway with wide shoulders and minor realignments. MDT has programmed Federal and State matching funds for the project, has completed design work, and is acquiring right-of-way for the project in advance of planned construction beginning in 2008. Where possible, MDT will acquire enough right-of-way to expand the highway to four-lanes if justified and documented in changes to the NEPA document for the project.

One issue that has been identified by stakeholders during interviews is the disparity between posted speed limits between trucks and other vehicles. There is a regulatory speed differential that limits truck speed to 10 miles per hour slower than the posted passenger vehicle speed. This differential creates an inherent conflict between vehicles, which is exacerbated by the lack of passing lanes, and in some parts of the corridor, primarily along US 2, limited passing opportunities. Eliminating this disparity in vehicle speeds will improve overall traffic flow and reduce the potentially dangerous differential in vehicle speeds.

Harmonization of regulatory standards for trucks between the US and Canada is a long-standing issue in the area; however, institutional disagreements have hindered significant progress toward true harmonization of standards. Canadian truck sizes and weights are typically bigger and heavier than those allowed in Montana. Discussions with people in the trucking industry give the overall impression that harmonization between Canada and Montana isn't as important as regional harmonization of standards to influence the amount of truck traffic with Canadian sizes and weights rolling into the United States. This is because most destinations of those using Montana highways are outside of the State of Montana.

The study area will be investigated on three levels: 1) local; 2) regional; and 3) national.

Locally, the study area is comprised of the Montana portion of the Theodore Roosevelt Expressway including MT 16 between Culbertson and the US-Canadian border and US 2 east from Culbertson to the North Dakota state line, as illustrated in Figure 2 - 1 below.

Figure 2-1: Study Area – Local Level

For the purposes of this report, the assessment of existing conditions, the Montana portion of the study area will take precedence. This area includes all the counties that the Corridor crosses, Sheridan and Roosevelt counties, as well as counties in the vicinity of the Corridor: Daniels, McCone, Richland, and Valley County.[1] In reality, the economy of the study area functions as if there were no state boundary between North Dakota and Montana. Due to their remote, rural natures, the economies of the adjacent areas in both states are more closely tied to each other than to the rest of their respective states.

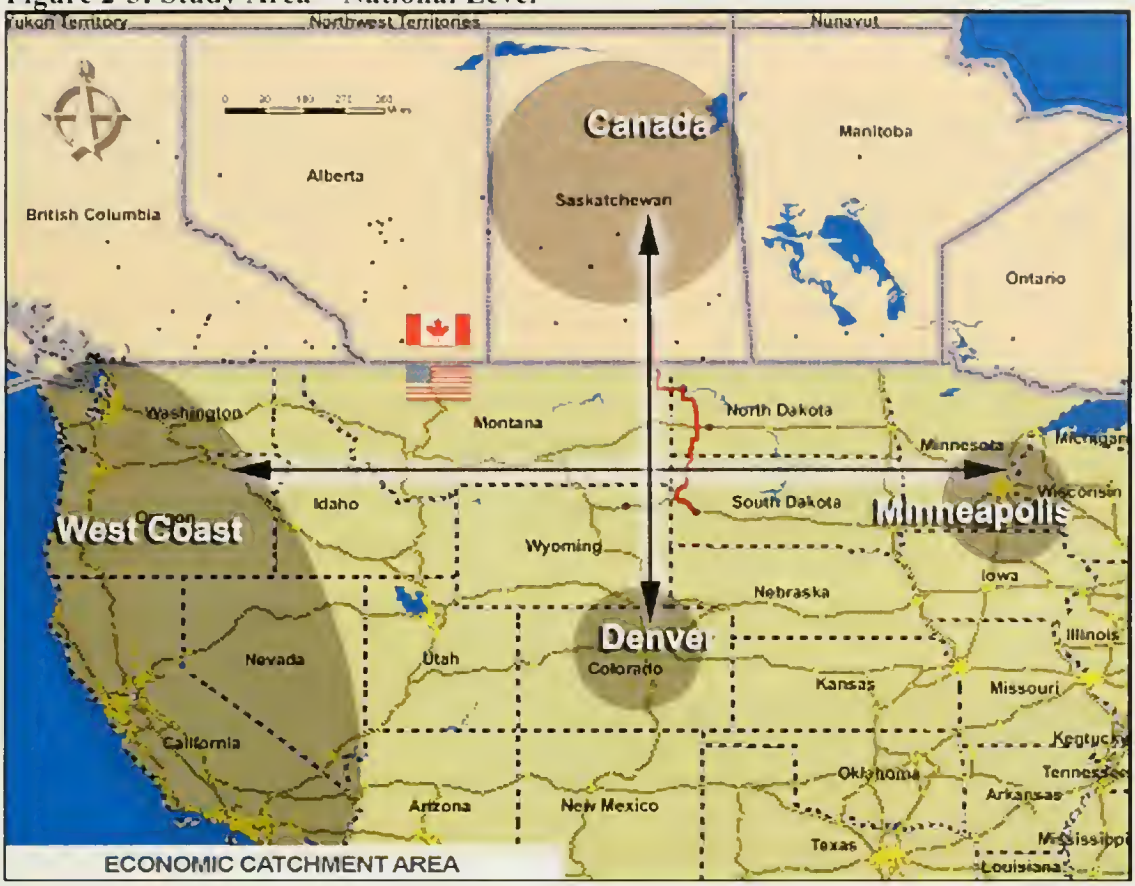
The US 2 and MT 16 sections of the Theodore Roosevelt Expressway are important because they provide regional connectivity with North Dakota and Saskatchewan. In fact, in August 2005, Congress named MT 16 between Culbertson and the Canada border and US 2 east from Culbertson to the North Dakota state line as segments of the Theodore Roosevelt Expressway "High Priority Corridor." Some of the major metropolitan areas in the region include Great Falls and Billings in Montana, Rapid City in South Dakota, and Regina and Saskatoon in Canada, as illustrated in Figure 2 - 2 below.

[1] As it will become apparent in the rest of the paper, this area, within the study area, was considered for the purpose of presenting and discussing Census data (which is readily available at the county level). These counties will collectively be referred to throughout the paper as the 6-county study area.

Figure 2-2: Study Area – Regional Level

On a larger scale, the study area encompasses the entire northwestern region of the United States and the southwest portion of Canada bordering Montana and North Dakota, as shown in Figure 2 - 3. The entire 2236 mile corridor, called the "Great Plains International Corridor," begins in Port of Laredo, Texas and ends at the Port of Raymond, Montana and runs through nine states. It is comprised of three segments: the "Theodore Roosevelt Expressway" running from the Port of Raymond, Montana to Rapid City, South Dakota (445 miles), "The Heartland Expressway" stretching from Rapid City to Limon, Colorado (401), and The Ports to Plains Trade Corridor which begins in Limon and ends in Laredo, Texas (1390 miles). In particular, travel and freight opportunities from Denver, Colorado and points south to Saskatchewan, Canada and the West Coast to Minneapolis, Minnesota and beyond are considered.

Figure 2-3: Study Area – National Level



2.2 Population and Social Conditions

2.2.1 Population

The total population of the six-county study area is about 33,900 (2005 estimate), about 3.6 percent of Montana's population. The area can be described as remote rural in character. The 2003 Metropolitan and Micropolitan Statistical Area Codes indicate that the counties have no urban centers of over 10,000 and no social and economic integration with any economic core of 50,000 or more.

Most people in the six-county study area live in Roosevelt (pop. 10,524), Richland (9,096), and Valley (7,143) Counties. The remaining three counties account for about 20 percent of the total people in the study area (Table 2 – 1).

Figure 2-4: Population in Montana and the Study Area

Source: U.S. Census Bureau, 1990 and 2000 Census

Figure 2 - 4 and Table 2 - 1 show that population in the study area is declining. In the core study area, the total population decreased by 8.1 percent between 1990 and 2000 and by another 5.9 percent between 2000 and 2005. The declining trend is observed in all counties in the study area. In the Montana and nearby North Dakota counties in the study region, population change is roughly correlated with population size; more populous counties have tended to decline more

slowly. The largest county in the broader region, Ward (Minot), North Dakota, grew marginally in the 1990-2000 period.

The regional population trajectories of the study area are difficult to compare to Montana as a whole. The Great Plains area, including eastern Montana, has seen a persistent loss of population extending from Texas through Saskatchewan[2], which contrasts with the pattern of growth in urban and high amenity areas typical in Montana's more mountainous, western parts. The Census figures shown in table 2-1 indicate that Montana's state-wide population increased by 12.9 percent between 1990 and 2000 and by another 3.7 percent between 2000 and 2005, while the six-county study area declined by 8.1 and 5.9 percent in these same periods.

Both North Dakota and Saskatchewan have experienced slow to negative growth in recent years (see Section 4.3). Between 1990 and 2000, North Dakota experienced modest growth of 0.53 percent, but Census estimates suggest that trend has reversed since then. Those North Dakota counties closest to the Montana study area have seen a similar pattern of decline as their Montana peers (Table 2.1). In South Dakota, overall population growth has been moderately positive: growing 8.45 percent between 1990 and 2000, and 2.79 percent between then and 2005.

Table 2-1: Population in Montana, North Dakota, and South Dakota

	Population 2005 (est.)	Population change 2000-2005	Population change 1990-2000
Montana	935,670	3.70%	12.90%
Six County Study Area	33,928	-5.90%	-8.10%
Roosevelt	10,524	-0.90%	-3.40%
Richland	9,096	-5.90%	-9.80%
Valley	7,143	-6.90%	-6.80%
Sheridan	3,524	-14.20%	-13.30%
Daniels	1,836	-9.00%	-11.00%
McCone	1,805	-8.70%	-13.10%
North Dakota	636,677	-0.86%	0.53%
Ward	55,767	-5.20%	1.50%
Williams	19,282	-5.90%	-6.50%
Mountrail	6,513	-1.70%	-5.60%
McKensie	5,594	-2.50%	-10.10%
Divide	2,149	-5.90%	-21.20%
Burke	2,032	-9.40%	-2.50%
South Dakota	775,933	2.79%	8.45%

Source: U.S. Census Bureau

[2] Fulton, Murray, Rose Olfert, Mark Partridge, *Population Growth – Double or Nothing? Preparing for Saskatchewan's Next 100 Years*, Canada Rural Economy Research Lab, University of Saskatchewan (http://www.crerl.usask.ca/policy_briefs/C-RERL_policy_brief_Sept_7_2005.pdf)

2.2.2 Major Cities

Table 2 - 2 lists the major cities in the six-county study area. Within the primary study area, the largest cities are Sidney with a 2004 population of 4,774 and Glasgow with 3,253. Wolf Point (pop. 2663) and Plentywood (2061) are also significant communities in the region. Similar to the population trend in the study area, the population in most of these cities is declining. As Table 2 - 2 shows, Census estimates show that the population of Plentywood declined by over 11 percent between 2000 and 2004, and Sidney's population declined by 6.2 percent during the same period. The exception is Wolf Point, which held steady recently.

Table 2-2: Major Cities in the Study Area and their Populations

Cities in the Six County Area	Population 2000	Population 2004 (Estimate)	Change in Population, 2000 – 2004
Sidney	4,774	4,480	-6.2%
Glasgow	3,253	3,084	-5.2%
Wolf Point	2,663	2,667	0.2%
Plentywood	2,061	1,827	-11.4%
Scobey	1,082	995	-8.0%
Poplar	911	913	0.2%
Culbertson	716	727	1.5%
Circle	644	577	-10.4%
Other Area Cities	**2000 Population**	**Distance from Culbertson**	**Gravity Rank**
Williston, ND	12,512	42 miles	3
Glendive, MT	4,729	90 miles	7
Regina, SK	178,225*	166 miles	1
Minot, ND	36,567	167 miles	5
Havre, MT	9,621	262 miles	8
Billings, MT	89,847	308 miles	4
Saskatoon, SK	229,927*	327 miles	2
Great Falls, MT	56,690	375 miles	6

*Source: U.S. Census Bureau; Statistics Canada (*2001 population figures). "Other Area Cities" refers to significant urban areas in the regional trade area. Gravity Rank is the product of the regional populations divided by the distance between them, ranked; the figures order real and potential trade relationships, ignoring the influence of trade and traffic barriers.*

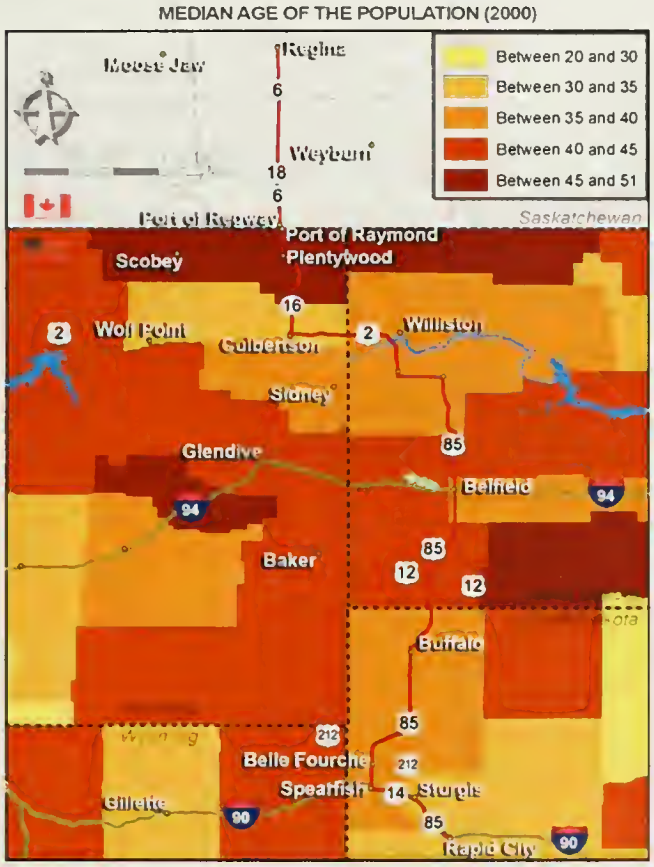
Table 2 -2 also lists urban areas in the broader regional trade area, showing population and distance from Culbertson (the approximate center of the study corridor). The table also shows a ranking of gravity calculations, a gauge of trade attractions if we assume no trade impediments (i.e., these figures rank potential regional trade relationships.) The closest mid-sized trade area to the corridor is Williston, 42 miles east of Culbertson, which is, by many accounts, a main

destination for basic consumer purchasing. Billings also scores high on the gravity figures, and this has also been reported as a main source of wholesale and retail goods. Interestingly, Regina and Saskatoon, Saskatchewan, rank above all cities on the gravity measure; this is because they are the closest large trade centers to the study area. The gravity figures suggest regional opportunities in the economic region. There would be local economic advantages from improved connections to the east (North Dakota) and north (Saskatchewan).

2.2.3 Age Distribution

Figure 2 - 5 shows the age distribution of the population in the study area. Table 2 - 3 shows a comparison of the age distribution of the population in the 6-county study area with the age distribution in the state and nationwide. As the table shows, the percentage of youth and children in the 6-county study area (individuals 19 years of age and younger) was higher than in Montana on average or nationwide. However, the percentage of young adults between 20 and 34 years of age was substantially lower than the state or national average. This finding is consistent with the declining population trends reported above and suggests that younger people are leaving the region in pursuit of either education or work.

Figure 2-5: Age Distribution of Population in Study Area in Year 2000



Source: U.S. Census Bureau, 1990 and 2000 Census

In contrast, the percentage of seniors (individuals aged 65 and over) in the six-county study area was higher than in the state or nationwide. The distribution in other age categories was similar to that of all of Montana. It should be noted here that in the six-county study area as well as in the entire state, the percentage of middle age and older workers was somewhat higher than the national average. The age distribution of individuals in North Dakota and South Dakota is similar to that of Montana, with the percentage of individuals age 65 and over slightly higher than the national average.

Table 2-3: Age Distribution of Population in Year 2000, Percentage of Total Population

Age Categories	6-County Study Area	Montana	North Dakota	South Dakota	United States
19 years and younger	30.6%	28.5%	28.5%	30.2%	28.6%
20 to 34 years	13.2%	17.9%	19.9%	19.1%	20.9%
35 to 54 years	30.1%	30.7%	28.6%	28.2%	29.4%
55 to 64 years	9.5%	9.4%	8.3%	8.3%	8.6%
65 and over	16.7%	13.4%	14.7%	14.3%	12.4%

Source: U.S. Census Bureau, 2000 Census

2.2.4 Race Distribution

Table 2 - 4 shows the race profile of the population in the six-county study area and compares it with the race distribution in the state and the nation. A distinctive characteristic of the six-county study area is a high proportion of American Indians. This population group accounts for 19.1 percent of total population as compared to 6.2 percent for all of Montana and 0.9 percent of the entire United States. On the other hand, the percentage of Black or African Americans in the 6-county study area (as well as in all of Montana) is very small compared to all of the United States (0.1 percent in the six-county study area as opposed to 12.3 percent nationwide). The majority of the population in the six-county study area is white, accounting for 78.4 percent of the total.

Table 2-4: Race Distribution, Percentage of Total Population

Race	Six-County Study Area	Montana	United States
White	78.4%	90.6%	75.1%
Black or African American	0.1%	0.3%	12.3%
American Indian and Alaska Native	19.1%	6.2%	0.9%
Asian	0.3%	0.5%	3.6%
Other	2.1%	2.4%	8.1%

Source: U.S. Census Bureau, 2000 Census

2.2.5 Mobility Status

Table 2 - 5 shows the mobility status of individuals in the study area. The table shows that only about 31 percent of individuals living in the six-county study area had changed residence in the last 5 years. This is substantially less than the 45.6 percent of people in Montana and 43 percent nationwide who changed residences during that period. If people in the six-county study area changed their residence between 1995 and 2000, they tended to move within the same county. Of those individuals living in the six-county study area, only 6 percent had moved to the area from a different state between 1995 and 2000. This contrasts strongly with the statewide average of 13.2 percent and the nationwide rate of 8.4 percent of people who moved to a new residence from another state.

The data presented in Table 2 - 5 suggests that, on average, the population in the six-county study area is less mobile than the nation as a whole; that is, they tend to live in the same residence for longer periods of time. In addition, the table suggests that relatively few people from outside of the six-county study area, especially those in other states, are coming to settle in the area. This observation is, in turn, consistent with the pattern of declining population and the relatively small proportion of young adults residing in the area. Figure 2 - 6 illustrates the population migration within the six-county study area.

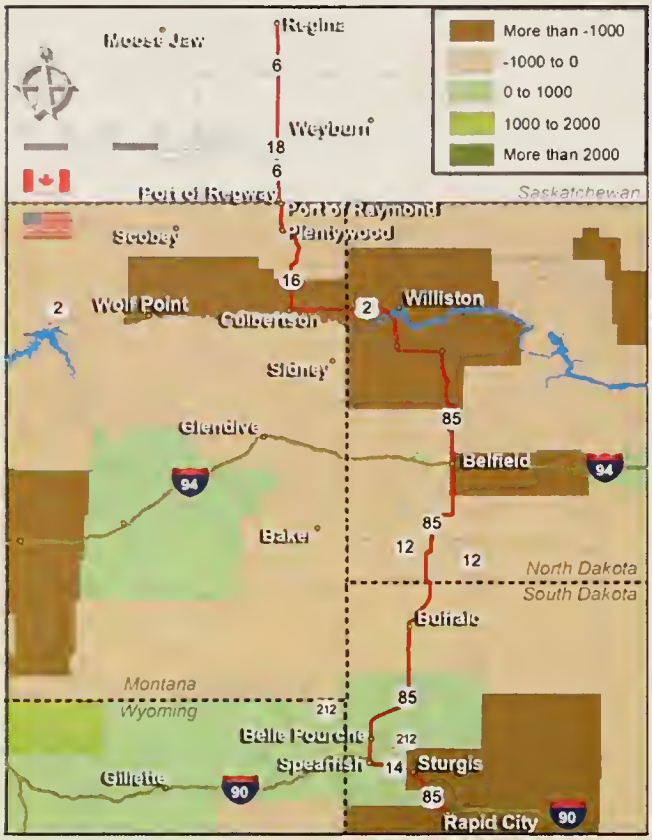
Table 2-5: Change in Place of Residence between 2000 and 1995, Percentage of Population 5 Years and Older

Place of Residence in 1995 Compared to 2000	Six-County Study Area	Montana	North Dakota	South Dakota	United States
Different Residence in 1995	31.0%	45.6%	42.0%	43.3%	43.0%
Same county	17.3%	22.5%	21.8%	21.2%	24.9%
Different county	13.7%	23.1%	20.2%	22.1%	18.1%
Same state	7.8%	9.9%	10.2%	11.8%	9.7%
Different state	6.0%	13.2%	10.0%	10.3%	8.4%

Source: U.S. Census Bureau, 2000 Census

Figure 2-6: Population Migration between 2000 and 1990

POPULATION MIGRATION (1990 - 2000)



Source: U.S. Census Bureau, 1990 and 2000 Census

2.2.6 Income Status

Table 2 - 6 shows the income distribution among households in the six-county study area and compares it with the distribution for the entire state and the entire country. The table shows that in the six-county study area the proportion of households with incomes less than $35,000 was larger than on average in Montana or all of the United States (58.9 percent in the 6-county study area as opposed to 52.7 percent in Montana and 41.4 percent in the United States). It should be pointed out that Montana lags behind the nation in the percentage of households with income over $75,000. Just 11.9 percent of households claim such income in Montana, and 8.5 percent in the 6-county study area. Nationally, the rate is almost double that, at 22.5 percent.

Table 2-6: Household Income Distribution

Income Bracket	Six-County Study Area	Montana	United States
Less than $10,000	14.0%	11.3%	9.5%
$10,000 to $14,999	10.0%	8.9%	6.3%
$15,000 to $24,999	18.9%	17.1%	12.8%
$25,000 to $34,999	16.0%	15.4%	12.8%
$35,000 to $49,999	17.6%	18.2%	16.5%
$50,000 to $74,999	15.0%	17.1%	19.5%
$75,000 to $99,999	4.7%	6.4%	10.2%
$100,000 to $149,999	2.6%	3.6%	7.7%
$150,000 to $199,999	0.6%	0.9%	2.2%
$200,000 or more	0.6%	1.0%	2.4%
Less than $35,000	58.9%	52.7%	41.4%
$75,000 or more	8.5%	11.9%	22.5%

Source: U.S. Census Bureau, 2000 Census

In view of the results reported above, it can also be expected that the incidence of poverty in the six-county study area is higher than is average for Montana or the nation. As Table 2 - 7 reports, almost 15 percent of families and 19 percent of individuals in the six-county study area were classified as living below the poverty level. This is a higher rate than the 10.5 percent of families and 14.6 percent of individuals in Montana who live below the poverty level, and the 9.2 percent of families and 12.4 percent of individuals who live in these conditions in the US.

Table 2-7: Poverty Status

Poverty Measure	Six-County Study Area	Montana	United States
Families below Poverty Level, Percent of Total	14.7%	10.5%	9.2%
Individuals below Poverty Level, Percent of Total	18.9%	14.6%	12.4%

Source: U.S. Census Bureau, 2000 Census

2.3 Industry Structure and Trends

2.3.1 Employment by Industry

Table 2 - 8 shows employment structure in the Six-county study area and compares it with that of all of Montana and the United States. The table shows that the largest industry in terms of employment is the education, health care and social services sector, accounting for over 23 percent of total employment, a higher proportion than the state or nation.

The second largest industry in the six-county study area is the agriculture, forestry, fishing, hunting, and mining sector, accounting for 19.7 percent of total employment. This figure contrasts strongly with the state and nationwide employment structure: on average this sector accounts for 7.9 percent of employment in the state and 1.9 percent in the United States overall, and indicates the study area's heavy reliance on basic natural resources industries.

Table 2 - 8 shows employment location quotients for the six-county study area. Location quotients compare industries' shares of local to national employment, and are an indicator of relative industry concentration. The quotients are often interpreted as indicators of net exporting industries. Several general observations can be made from these quotients.

Table 2-8: Employment by Industry, Percent of Total Employment in 2000

Industry	Six-County Study Area	Location Quotient	Montana	United States
Agriculture, forestry, fishing and hunting, and mining	19.7%	10.37	7.9%	1.9%
Construction	5.6%	0.82	7.4%	6.8%
Manufacturing	2.6%	0.18	6%	14.1%
Wholesale trade	2.9%	0.81	3%	3.6%
Retail trade	11.2%	0.96	12.8%	11.7%
Transportation and warehousing, and utilities	5.8%	1.12	5.4%	5.2%
Information	1.9%	0.61	2.2%	3.1%
Finance, insurance, real estate, and rental and leasing	3.6%	0.52	5.5%	6.9%
Professional, scientific, management, administrative, and waste management services	2.8%	0.30	6.5%	9.3%
Educational, health and social services	23.1%	1.16	21.7%	19.9%
Arts, entertainment, recreation, accommodation and food services	7.8%	0.99	10.4%	7.9%
Other services (except public administration)	5.3%	1.08	5.3%	4.9%
Public administration	7.7%	1.60	5.9%	4.8%

Source: U.S. Census Bureau, 2000 Census
Notes: Location Quotients shown here are the percentage of industry to total employment in 6-county study region divided by the percentage for the U.S. Quotients greater than 1.00 indicate greater concentration of an industry in the area than in the U.S. The six counties are Roosevelt, Richland, Valley, Sheridan, Daniels, and McCone.

Most striking in Table 2 – 8 is the high concentration of employment in "Agriculture, forestry, fishing, and mining." The 10.37 location quotient means that employees in this region are over ten times as likely to work in this industry as they are in the nation as a whole, reflecting the region's specialization in basic natural resources. Public administration also is relatively high, at 1.6 times the national rate of jobs in this industry. Transportation and related jobs, too, are relatively concentrated in the area, at 1.12 times the national average. Finally, although both "Arts, entertainment, recreation, accommodations, and food services" and "Retail trade" sectors are below the national average (suggested by location quotients of less than one, they are only marginally so. The region holds its own in these industries.

Other industries are less well represented. Most remarkable is the very low (0.18) quotient for Manufacturing. Also, the three professional service industries tend to be less well represented in the study area.

Other basic sectors such as manufacturing, finance and insurance, and professional and scientific services play a much smaller role in the six-county study area than on average in the state or the entire country, accounting for only 2.6 percent, 3.6 percent, and 2.8 percent of employment, respectively. Retail trade employment in the study area is quite comparable to, although marginally lower than, the state and national rates.

Later in this report (see Table 4-2), comparable figures are presented for neighbouring counties in North Dakota. The broad similarities of these figures help highlight broad regional commonalities and interdependencies. Comparison of the location quotients between these two neighboring counties suggests that the North Dakota area, and particularly Williston, is a service center source for professional and financial services. This economic region crosses state lines.

Table 2 - 9 shows employment by industry for the six-county study area, Montana, and all of the United States for 1990. Comparison of this table with Table 2 - 8 allows for identification of trends in employment and the local industrial structure.[3]

Table 2-9: Employment by Industry, Percent of Total Employment in 1990

Industry	Six-County Study Area	Location Quotient	Montana	United States
Agriculture, forestry, and fisheries	10.1%	3.74	9.6%	2.7%
Mining	1.6%	2.67	1.6%	0.6%
Construction	5.7%	0.92	5.8%	6.2%
Manufacturing, nondurable goods	2.7%	0.39	2.7%	7.0%
Manufacturing, durable goods	4.7%	0.44	4.9%	10.7%
Transportation	4.7%	1.07	4.7%	4.4%
Communications and other public utilities	2.7%	1.00	2.7%	2.7%
Wholesale trade	3.7%	.084	3.7%	4.4%
Retail trade	19.3%	1.15	19.4%	16.8%
Finance, insurance, and real estate	4.9%	0.71	5.0%	6.9%
Business and repair services	3.9%	0.81	3.9%	4.8%
Personal services	3.5%	1.09	3.6%	3.2%
Entertainment and recreation services	1.4%	1.00	1.5%	1.4%
Health services	8.6%	1.02	8.6%	8.4%
Educational services	10.1%	1.22	10.1%	8.3%
Other professional and related services	6.7%	1.02	6.7%	6.6%
Public administration	5.7%	1.19	5.6%	4.8%

Source: U.S. Census Bureau, 1990 Census
Notes: See table 2 -8 for a definition of location quotients.

While changes in industry definitions limit the direct comparability of Tables 2 - 8 and 2 - 9, a few broad observations can be made. In the six-county study area employment in agriculture, forestry, fishing, hunting and mining increased its share of total employment has over the period 1990 to 2000 (from about 11.7 percent of total employment in 1990 to 19.7 percent in 2000). In contrast, in Montana and all of the United States, the share of employment in these industries declined. This suggests increasing specialization and competitiveness in this regional industry over the decade. A similar point can be made about the public administration, which increased its jobs share (i.e., location quotient) in the region over the decade compared to the national profile.

On the other hand, employment in manufacturing in the six-county study area has declined over the period from 1990 to 2000, from about 7.4 percent of total employment to 2.6 percent. The declining trend in the share of manufacturing in total employment was also observed on average in Montana and nationwide, although somewhat less markedly.

[3] Note that a full comparison of employment structure in year 1990 and 2000 is not possible due to changes in reporting and job classification.

Relative employment (i.e.: the change in industries' percentage of total employment) also declined in wholesale trade, retail trade, and finance and the insurance industry. Except for the finance and insurance industry, a similar trend was observed in general in Montana and nationwide. The share of employment in the finance and insurance industry increased in Montana and all of the United States, but declined in the study area.

Industries where relative employment in the six-county study area has increased include public administration and health and educational services. Relative employment in the health and educational services sector has also increased on average in the state and all of the United States, although at a smaller rate. Employment in public administration in Montana and nationwide remained relatively stable over the years from 1990 to 2000.

2.3.2 Output and Establishments by Industry

Table 2 - 10 shows the industrial structure (number of establishments, value of sales, and employment) of Montana's non-farm economy. The largest industry in terms of sales was retail and wholesale trade followed by manufacturing, health care and social assistance, and construction. The retail trade was still the largest industry in the state of Montana in terms of the number of establishments, followed by construction and the accommodation and food services. In terms of employment, retail trade was again the largest industry, followed by health care and social assistance, accommodation and food services, and construction.

Table 2 - 10 also provides partial information for the six-county study area. Unfortunately, much of the information is not available at the six-county study area level, as some data are not collected at the county level and other data are not disclosed due to a small number of businesses.

Table 2-10: Industrial Structure of the 6-County Study Area and the State

NAICS Code	Industry Description	Montana			Six-County Study Area		
		Establishments	Sales ($1,000)	Employment	Establishments	Sales ($1,000)	Employment
21	Mining and Oil & Gas Extraction	266	1,226,555	4,622	X	X	X
22	Utilities	221	X	3,057	X	X	X
23	Construction	4,025	3,372,837	22,506	X	X	X
31-33	Manufacturing	1,234	4,987,577	18,582	X	X	X
42	Wholesale Trade	1,485	7,223,420	13,728	64	X	474
44-45	Retail Trade	5,145	10,122,625	52,891	235	319,218	1,643
48-49	Transportation and Warehousing	1,148	996,647	9,094	X	X	X
51	Information	633	X	9,357	25	X	421
52	Finance and Insurance	1,803	X	13,596	X	X	X
53	Real Estate, rental, and Leasing Services	1,416	520,932	4,763	X	X	X
54	Professional, Scientific and Technical Services	2,886	1,249,057	15,617	67	X	260
55	Management of Companies and Enterprises	104	50,898	1,546	X	X	X
56	Administrative, Support and Waste Managements Services	1,299	544,236	12,616	X	X	X
61	Educational Services	188	39,674	876	X	X	X
62	Health Care and Social Assistance	3,032	3,432,698	51,770	84	X	2,112
71	Arts, Entertainment, and Recreation	922	486,116	9,252	29	X	173
72	Accommodation and Food Services	3,260	1,537,986	40,918	122	32,664	1,027
81	Other Services	2,231	737,387	10,295	82	X	308

Source: U.S. Census Bureau, 2002 Economic Census

Notes: X denotes data that are not available, not collected at the county level, or not disclosed due to a small number of businesses and potential confidentiality issues.

From the partial information that is available, it follows that the largest sector in terms of employment in the six-county study area is health care and social assistance, with over 2,000 employees. In terms of the number of establishments, the largest sector was retail trade, with 235 establishments. Retail trade was the second-largest sector in the study area in terms of employment, with 1,643 employees. Accommodation and food and services industry was the second-largest sector in terms of the number of establishments (with 122 businesses) and third-largest in terms of employment (with 1,207 employees).

The largest growth industries (in terms of employment) in both Montana and the six-county study area were health care and social assistance, arts, entertainment and recreation, as well as "other" services and professional services industries. In Montana, a strong growth was also experienced in the information, construction, and administrative support services (see Table 2 - 11).

Table 2-11: Change in Industrial Structure in Montana and the Six-County Study Area, 1997-2002

NAICS Code	Industry Description	Montana		Six-County Study Area	
		Establishments	Employment	Establishments	Employment
21	Mining and Oil & Gas Extraction	-9.5%	-13.3%	X	X
22	Utilities	2.8%	-7.3%	X	X
23	Construction	16.6%	24.4%	X	X
31-33	Manufacturing	6.4%	-5.2%	X	X
42	Wholesale trade	-5.7%	-4.4%	-15.8%	-13.3%
44-45	Retail trade	2.0%	9.4%	-0.8%	4.4%
48-49	Transportation & warehousing	18.7%	3.8%	X	X
51	Information	11.4%	32.2%	X	X
52	Finance & insurance	16.1%	8.1%	X	X
53	Real estate & rental & leasing	19.4%	11.7%	X	X
54	Professional, scientific, & technical services	38.6%	45.5%	17.5%	21.5%
56	Administrative & support & waste management & remediation services	34.2%	29.0%	X	X
61	Educational services	77.4%	47.2%	X	X
62	Health care & social assistance	49.1%	230.3%	47.4%	407.7%
71	Arts, entertainment, & recreation	44.3%	64.1%	107.1%	133.8%
72	Accommodation & food services	-0.6%	6.1%	-14.7%	17.8%
81	Other services (except public administration)	38.4%	47.4%	34.4%	115.4%

Source: Based on U.S. Census Bureau, 2002 Economic Census and 1997 Economic Census
Notes: X denotes data that are not available, not collected at the county level, or not disclosed due to a small number of businesses and potential confidentiality issues

2.4 Key Industries and Sectors in the Study Area

There are several key industries in the study area. Arguably, the largest and most important basic industry in the state and specifically in the study area is the agriculture sector. Other important areas include energy, tourism, and the retail trade sector.

2.4.1 Agriculture

The study area represents some of the largest centers of agricultural production in Montana. Table 2 - 12 presents some of Montana's most heavily produced agricultural crops. As can be seen, the six-county study area combined accounted for about 30 percent of harvested crops of wheat, oats, and sugar beets. (At the same time, population in the 6-county study area accounted for only about 4 percent of state population).

Compared to 2000, production of wheat in the six-county study area increased, but at a smaller rate than in the state (13.6 percent in the six-county study area versus almost 28 percent in all of Montana), and production of barley increased at a much faster rate than in the state (69.2 percent in the 6-county study area versus 28.9 in Montana). On the other hand, production of oats and sugar beets has declined.

Table 2-12: Agricultural Production in Montana and Six-County Study Area, 2004

Agricultural Crop	Montana	Six-County Study Area	Six-County Study Area as Percentage of Montana	Change in Production, 2000 – 2004, Percent	
				Montana	Six-County Study Area
Wheat, all Types, Millions of Bushels	173.1	52.5	30.3%	27.9%	13.6%
Barley, Thousands of Bushels	48,970.0	3,513.0	7.2%	28.9%	69.2%
Oats, Thousands of Bushels	2,400.0	693.0	28.9%	-7.7%	-13.8%
Sugar Beets, Thousands of Tons *	1,131.0	383.2	33.9%	-14.3%	-20.5%

Source: United States Department of Agriculture, National Agricultural Statistics Service
** See Table A-1 in Appendix A for Acres of Crops Planted*

There are also some specialty crops produced in the study area. Table 2 - 13 shows that between 2000 and 2004, there was a substantial increase in almost all of the crops whose production is more than 2/3 concentrated within the study area.

Table 2-13: Agricultural Production in Montana and the Six-County Study Area, Specialty Crops, 2004

Agricultural Crop	Montana	Six-County Study Area	Six-County Study Area as Percentage of Montana	Change in Production, 2000 – 2004, Percent	
				Montana	Six-County Study Area
Flaxseed, Thousands of Bushels *	342.0	321.0	93.9%	74.49%	168.62%
Wheat Durum, Thousands of Bushels	17,985	16,746	93.1%	36.66%	43.63%
Lentils, Thousand Hundredweight *	1,008.0	827.0	82.0%	380.00%	513.05%
Peas (All Dry Edible), Thousand Hundredweight *	1,266.0	930.0	73.5%	508.65%	3269.57%
Safflower, Thousands of Pounds *	21,080	11,231	53.3%	-29.80%	-45.81%
Canola, Thousands of Pounds *	23,850	12,490	52.4%	-57.17%	-43.37%
Wheat Spring, Thousands of Bushels	88,350	35,085	39.7%	14.00%	7.94%
Corn for Grain, Thousands of Bushels	2,145	212	9.9%	-4.24%	-24.29%
Beans (All Dry Edible), Thousand Hundredweight	285.0	11.4	4.0%	-44.34%	-89.97%

Source: United States Department of Agriculture, National Agricultural Statistics Service
** See Table A-1 in Appendix A for Acres of Crops Planted*

One specialty crop to note is the safflower. There has been an increasing trend in the United States toward consuming healthier oil. Research suggests that healthy oil should be high in mono-unsaturates and low in saturated fats. Montola safflowers produce oil that is high in oleic acid and low in saturated fat. Montola Growers Inc. reports exclusive rights to the Montola 2000 and 2001 seed varieties developed at Montana State University's Agricultural Research Center, which are used in producing the oil. Several studies have determined that Montola Safflower Oil is even healthier than olive oil, which is commonly thought of as the healthiest oil available.

Montola Growers Inc. is owned and operated in northeast Montana. Their seed crushing facility is located in Culbertson, within the study area. In addition to producing healthy vegetable oils that are high in quality, Montola Growers Inc. also produces protein meal and birdseed. Recently, Sustainable Systems of Missoula bought Montola Growers, Inc. They have plans to build a bio-diesel production facility in Culbertson (see Section 2.4.2 for a description of the Montola/Sustainable Systems project).

The trend towards consuming healthier oils could increase production of safflower and canola in the future. However, Table 2 - 13 shows a decrease in production of both safflower and canola. Since production is reported in thousands of pounds produced, it is possible that harvested acreage actually increased in the four year period, but that yields were down. For example, safflower is very sensitive to frost and is a poor competitor with weeds, so factors such as these may have caused decreased in the actual yield of safflower.

Following this trend towards consuming healthier food, organic products have become increasingly popular in recent years. As can be seen in Table 2 - 14, the 6-county study area accounts for 14.6% of farms growing organic crops and 16% of the total value of certified organically produced commodities in the state.

Table 2-14: Agricultural Production in Montana and the Six-County Study Area, Organically Produced Commodities, 2002

Agricultural Statistic	Montana	Six-County Study Area	Six-County Study Area as Percentage of Montana
Farms, Number	137	20	14.6%
Value of Certified Organically Produced Commodities, $1000	$3,847	$617	16.0%

Source: USDA, National Agricultural Statistics Service, 2002 Census of Agriculture

Montana's cattle sector comprises the largest percentage of the state's livestock industry. Table 2 - 15 shows that this sector is important in the six-county study area, with 10.6% of the industry concentrated in this region. Despite the fact that cattle numbers have decreased in the state by 7.69%, there has actually been a rather substantial increase in cattle numbers in the six-county study area. The sheep sector has 7.7% of the industry concentrated in the six-county study area. Sheep numbers have fallen in both the state and in the six-county study area, but the six-county study area experienced a gentler drop.

Table 2-15: Agricultural Production in Montana and the Six-County Study Area, Livestock, 2004

Agricultural Livestock	Montana	Six-County Study Area	Six-County Study Area as Percentage of Montana	Change in Counts, 2000 – 2004, Percent	
				Montana	Six-County Study Area
Cattle All, Heads	2,400,000	255,000	10.6%	-7.69%	10.39%
Sheep, heads	300,00	23,000	7.7%	-18.92%	-10.51%

Source: United States Department of Agriculture, National Agricultural Statistics Service

Table 2 - 16 and Table 2 - 17 show dairy numbers for the state and nation. It can be seen that between 2000 and 2004, the number of milk farms and the number of milk cows decreased in both Montana and the United States. The decrease in the number of milk farms in the United States was much more substantial in this period than it was in the state. The total production of milk has increased in both the state and in the nation, but not by a significant amount. It is evident from Table 2 - 16 that Montana does not currently control a very large percentage of the dairy industry.

Table 2-16: Agricultural Production in Montana and the United States, Dairy, 2004

Agricultural Statistic	Montana	United States	Montana as Percentage of US	Change in Production, 2000 – 2004, Percent	
				Montana	US
Milk Farms, Number	600	81,520	0.70%	-7.69%	-22.40%
Milk Cows, Thousand Heads	18	9,012	0.20%	-5.56%	-2.08%
Total Milk Production, Million Pounds	348	170,934	0.20%	2.96%	2.12%

Source: United States Department of Agriculture, National Agricultural Statistics Service

Table 2 - 17 shows the production of various ice cream products in Montana and in the United States. Between 2000 and 2004, there was a large increase in the production of low fat ice cream mix in the state even though the increase in production for the United States was small. However, Montana only produces a very small percentage of these products when compared to the country as a whole. A location quotient of 0.65 suggests that the state is an importer of milk products at this time.

Table 2-17: Agricultural Production in Montana and the United States, Specific Dairy Products, 2004

Dairy Product	Montana	United States	Montana as Percentage of US	Change in Production, 2000 – 2004, Percent	
				Montana	US
Ice Cream Lowfat Mix Produced, thousand gallons	1,018	224,464	0.45%	27.57%	6.71%
Ice Cream Lowfat Hard, thousand gallons	102	114,090	0.09%	-31.08%	28.86%
Ice Cream Lowfat Soft, thousand gallons	1,436	301,384	0.48%	-3.49%	5.81%
Ice Cream Lowfat Total, thousand gallons	1,538	415,474	0.37%	-5.99%	11.27%

Source: United States Department of Agriculture, National Agricultural Statistics Service

Table 2 - 18 illustrates other aspects of trends in the agricultural industry. The table shows that between 1997 and 2002 the land in farms in the 6-county study area increased by 5.5 percent and the number of farms increased by 9 percent. Although the percentage increase in the number of farms was smaller than in the entire state, the increase in farm land was much higher.

Table 2-18: Percentage Change in Number of Farms and Land in Farms in the 6-County Study Area and Montana, 1997 to 2002

Agricultural Statistic	Montana	6-County Study Area
Number of Farms	14.8%	9.0%
Land in Farms (millions of acres)	1.7%	5.5%

Based on Source: United States Department of Agriculture, 1997 Census of Agriculture and 2002 Census of Agriculture

The agriculture industry is highly dependent on transportation. In Montana, high rail rates and the increased trend towards consolidation of loading facilities present an obstacle to growth in the agriculture industry. Section 3.1.1 goes into a deeper analysis of this issue.

2.4.2 Energy

Montana has vast opportunities for energy development. The state is rich in natural resources and has great renewable energy potential. Importantly, Montana has the potential to produce a large supply of clean energy, such as bio-diesel, ethanol, and wind power. Montana also has considerable oil production capabilities.

Oil and Gas Industry

Northeastern Montana is the largest oil exploration area in Montana. A substantial share of oil production is concentrated in the study area.

As Table 2 - 19 shows, oil production has been expanding rapidly in Northeastern Montana and in the six-county study area in particular. Between 2000 and 2005, oil production in Northeastern Montana increased by 75 percent; in the six-county study area, production more than doubled. The growth rate was particularly strong in 2003 and 2004 at 25.6 percent and 57.7 percent, respectively. As a result, the six-county study area accounted for more than half of all oil production in the state.

Oil production is concentrated primarily in Richland, Roosevelt, and Sheridan Counties. In particular, production in Richland County increased almost four hundred percent between 2000 and 2004, with much of that increase occurring between 2003 and 2004. In fact, the increase in production of oil in Montana between 2003 and 2004 was almost entirely due to the increase in oil production in Richland County.

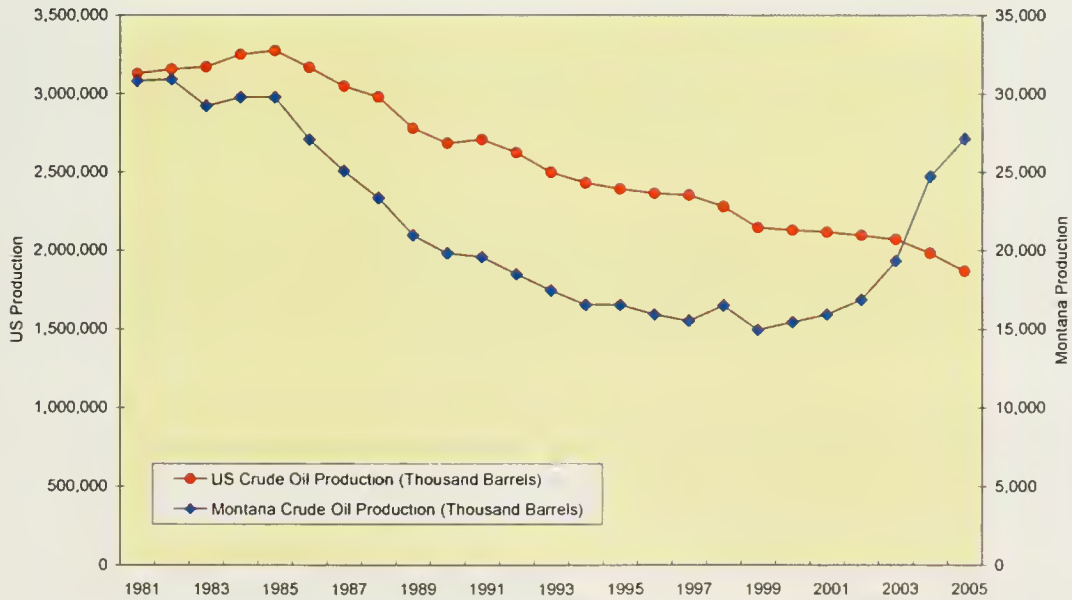
Table 2-19: Production of Oil in Montana, Northeastern Montana, and Six-county Study Area, Millions of Barrels

Geographic Area	2000	2001	2002	2003	2004
Montana	15.7	16.3	17	19.4	24.7
Northeastern Montana	12.6	13.4	14.3	16.8	22.1
6-County Study Area	**5.87**	**6.27**	**6.68**	**8.39**	**13.23**
Richland County	2.6	3	3.4	5.3	10.2
Roosevelt County	1.5	1.4	1.5	1.4	1.4
Sheridan	1.6	1.7	1.6	1.5	1.5
Valley County	0.17	0.17	0.18	0.19	0.13
Production in Six-County Study Area as Percentage of All of Montana	37.4%	38.5%	39.3%	43.2%	53.6%
Rate of Growth of Production in Six-County Study Area, in Percent		6.8%	6.5%	25.6%	57.7%

Source: Montana Oil and Gas. Annual Review, various issues, Montana Board of Oil and Gas

Figure 2 - 7 shows the substantial growth in crude oil production in Montana over the past couple of years. In fact, production is at its highest levels since the 1980s. Additionally, it is evident that Montana has recently gained a larger percentage of total US crude oil production.

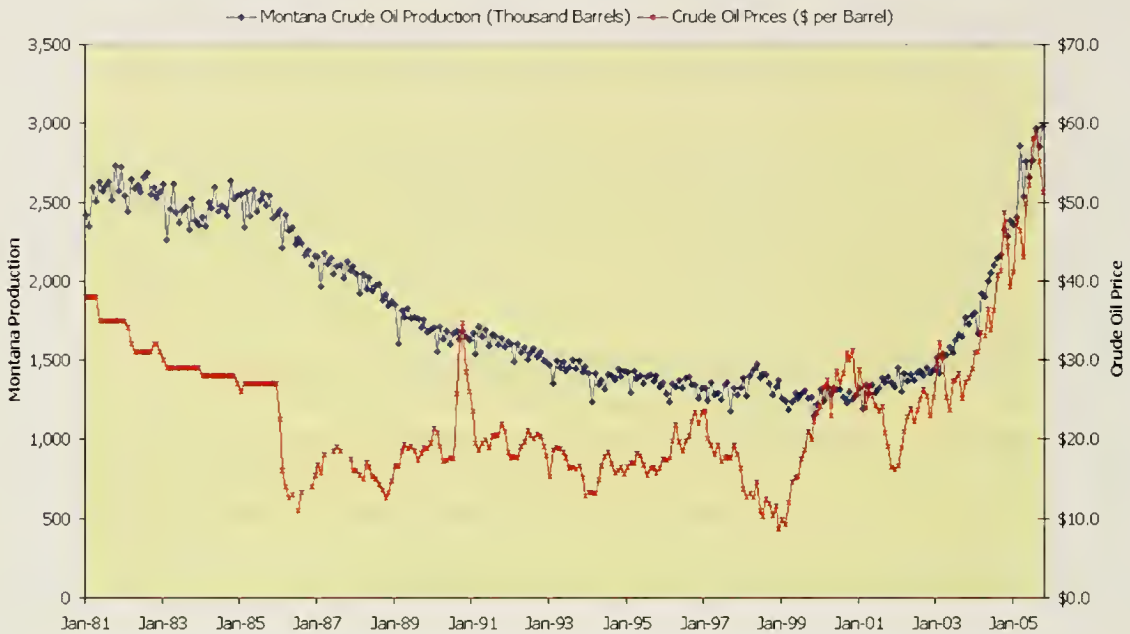
Figure 2-7: Crude Oil Production in the U.S. and Montana



Source: Energy Information Administration

Figure 2 - 8 on the next page shows that production of crude oil is cyclical and highly dependent on the price of crude oil. It is only profitable to drill when the price of crude oil is high enough, and this appears to be the trend in Montana. In the past 25 years, production of crude oil has followed prices very closely.

Figure 2-8: Montana Crude Oil Production with World Prices



Source: Energy Information Administration

There are four refineries in Montana: Conoco Phillips and Exxon Mobil in Billings, Cenex in Laurel, and Montana Refining in Great Falls. Almost all of the petroleum consumed in the state is produced in Montana refineries. About half of the remaining liquid fuel produced is exported.

A map outlining the petroleum pipelines in the state is shown in Figure 2 - 9. Recently, more than ¾ of the oil produced in Montana has been exported, mainly to Wyoming. However, the export of oil to Wyoming is moved via the eastern pipeline, which is not connected to any of the four Montana refineries, thus limiting the amount of Montana crude oil that can be refined in the state.

Data from the Bureau of Transportation Statistics show that the Port of Raymond, in the study area is the nation's eighth largest port in terms of the value of cross-border pipeline trade (i.e., oil imports). Two other Montana ports also rank: Sweetgrass at fourth, and Piegan at sixth.[4]

[4] US Department of Transportation, Bureau of Transportation Statistics, Transborder Surface Freight Data, Washington, DC, 1998.
http://www.bts.gov/publications/north_american_transportation_in_figures/html/table_6_3c.html

Figure 2-9: Map of Petroleum Pipelines in Montana

Source: Petroleum and Petroleum Products in Montana

Other Energy

In addition to crude oil, Montana has vast reserves of other valuable energy resources. Montana has the largest **coal** reserves in the United States and the fifth largest wind resource. It is also the 6th largest producer of coal, the 8th and 10th largest in terms of oil and natural gas wells drilled (as of 2003), respectively, and the 13th largest in terms of installed wind energy capacity.

As Figure 2 - 10 shows, energy production is prominent in and surrounding the study area. 94% of the state oil production, 36% of the state natural gas production, and 67% of the state oil and gas production tax is accounted for in eastern Montana. More specifically, 54% of the state's oil production, 10% of the state's natural gas production, and 25% of the state's oil and gas production tax (totaling $16.5 million) is concentrated in Richland County.

Figure 2-10: Existing Energy Production in Montana

Source: 2005 Census and Economic Information Center, Montana Department of Commerce
COE-US Army Corps of Engineers; CP-Cooperative Power; MDU-Mantana Dakata Utilities, Resources Group, Inc.; MVP-Mission Valley Power; NWE-Northwestern Energy; PGE-Portland General Electric; PPL-PPL Corporation; PSP-PSP Global

One promising energy source is **bio-diesel**, a renewable fuel used for diesel engines. It is derived from natural oils (i.e.: soybean oil and canola oil). There are numerous advantages resulting from the use of bio-diesel, such as environmental, economic, and quality benefits. Bio-diesel provides a cleaner alternative to gasoline and reduces dependency on foreign oil. In addition, bio-diesel may actually improve engine performance because of its lubricating properties. Bio-diesel would boost crop sales and prices for natural oils, thus further promoting Montana's agriculture industry. This renewable fuel meets clean diesel standards, and both the US Department of Energy and the US Department of Transportation have named it an alternative fuel. Also, the Congressional Budget Office and the US Department of Agriculture have said that bio-diesel is the most cost-friendly alternative to conventional diesel fuel within the limits of the Federal government's Energy Policy Act (EPAct) compliance requirements. Bio-diesel has relatively few harmful emissions compared to petroleum diesel. Tax incentives have been given to bio-diesel blenders to promote the use of bio-diesel energy.[5] In Montana, bio-diesel pumps have been open to the public since 2004 in Missoula County.

In addition to bio-diesel, **ethanol** is another potential natural resource for development in Montana. In the United States, ethanol is derived mainly from corn grain. Because 10% of corn gain production is concentrated in the 6-county study area, ethanol may prove to be a valuable energy source in Montana, and more specifically in the study area. An added benefit to using

[5] See *BIODIESEL, The Official Site of the National Biodiesel Board.*

ethanol as an energy source is that feed grain is a byproduct of producing the alcohol. The additional feed may increase opportunities in the livestock sector (specifically, cattle numbers may increase).

Another important natural resource is **wind energy**. Montana has the fifth largest pool of wind resources in the United States. There are several existing wind energy projects, as outlined in Table 2 - 20. Wind energy provides a reasonably priced means of obtaining inexhaustible, pollution free energy. In the last 20 years, the price of building wind energy projects has dropped more than 80%. Prices are now competitive with new coal or gas-fired power plants, costing less than 5 cents per kWh. Montana has various renewable energy incentives, such as tax credits, for renewable energy developments (i.e.: the tax credits required by the Energy Policy Act of 1992). Another important benefit of creating new wind energy plants is job potential. About 4.8 job-years of employment are provided per megawatt installed wind capacity.[6] Other economic benefits include tax revenues from annual property tax payments and increases in taxes on sales and use. Finally, there may be an increase in tourism as a result of people coming to visit the wind energy plants. In Washington, guided tours of the Wind Power project have been popular.

Table 2-20: Existing Wind Energy Projects

Existing Project or Area	Owner	Date Online	MW	Power Purchaser/User	Turbine
Blackfeet Reservation	Blackfeet Nation	1996	0.1	Glacier Electric Cooperative	Vestas V-17 (1)
Martinsdale Wind Farm	Martinsdale Hutterite Colony	2005	0.715	Martinsdale Hutterite Colony	Refurbished Nordtank 65 kW (11)
Judith Gap	Northwestern / Invenergy Wind	2005	135	Northwestern	GE Wind 1500kW (90)

Source: American Wind Energy Association

Because of the recent renewed interest in developing Montana's natural resources, **four energy related projects** have been proposed within the study area: the Valley County Wind Energy Project, the Nelson Creek Project (a coal project near Circle), the Montola/Sustainable System Project (a bio-diesel refinery in Roosevelt County), and the Yellowstone Ethanol LLC Power Plant (see Table 2 - 21).

[6] See *American Wind Energy Association*, www.awea.org.

Table 2-21: Proposed Energy Projects

Project	Estimated Energy Output	Estimated Employment	Estimated Costs
Rocky Boy Ethanol Dry mill ethanol production facility, Rocky Boy's Reservation, NE MT	• 40 or 60 million gallons/year (MMGY) ethanol, distiller's grains and solubles • Potentially wheat gluten	Operation: • 43 FT (40 MMGY) • 46 FT (60 MMGY) • Ave. Wage: ~$40,000/yr	• $84.5 million (40 MMGY) • $107.75 million (60 MMGY) • Direct labor & benefits: $1.8 million
Fisher Tropsch Coal liquefaction facility, Otter Creek Coal Tracks, SE MT	• 80,000 barrels/day synthetic fuels	Operation: • 2,000 PFT • Ave. Wage: $19-25/hr Construction: • 4,000	• $6 billion for construction over 5 years
Montola/Sustainable Systems Biodiesel refinery, NE MT, near Culbertson	• 15 million gallon/yr	Operation: • 31 FT • Ave. Wage: $14/hr	• $10-12 million • Total salary wages ~$1.5 million
Nelson Creek Project 500 MW circulating fluidized bed (CFB) clean coal technology and coal-fired mine mouth plant, Just west of Circle, MT	• 500 MW electric power	Operation: • 150 PFT • Ave. Wage: $60,000/yr Construction: • Peak: 1,200	• $900 million construction costs
Wind Hunter Project aka Valley County Wind Energy Project (VCWEP), north of Glasgow, MT	• Total 334 wind turbines generating 500 MW power • Built in 4 phases, and available by 2008-2015	Operation: • 89 FTE Construction: • 618 FTE Ave. wage: • $25,800/employee/yr	Construction: • $546.45 million inc. $20.21 million wages • $2.26 million in employee taxes O&M: • $4.99 million/yr in wages • $685,736/yr taxes

Source: The Montana Symposium: Energy Future of the West, Montana's Energy Symposium, October 2005; retrieved from: http://www.energyfuture.mt.gov

The Valley County Wind Energy Project (a.k.a. Wind Hunter Project) will generate up to 500 MW of wind energy using 334 wind turbines with a 30-mile 230 kV transmission line. The construction will take place in three phases, beginning in 2008 and ending in 2016. There has recently been an increasing market for "green power," and it is forecasted that there will be increased demand for electrical energy in the future. Wind generation is the fastest growing energy technology. There are a variety of economic incentives encouraging the construction of the Valley County Wind Energy Project. First, there will be a temporary increase in employment from 2006 through 2017 during the construction phases (approximately 618 full time employees will be needed). Some permanent jobs will also be created involving the operation and maintenance of the Valley County Wind Energy Project (an estimated 89 full time employees will be needed). Additionally, companies in need of energy will be able to relocate to Valley County. Thus, there is potential for a boost in the local economy resulting from additional jobs in the area.

The Nelson Creek Project is a proposed lignite-fired power plant to be built in Circle, Montana. This clean-coal mine-mouth power plant will provide 500 MW of electrical power. The construction will bring many temporary employment opportunities to the area. As many as 1,200 people will be needed during the construction period. 150 permanent full time employees will be needed to operate the project. The average wage for this project is $60,000 per year. This project will also aid in the development of the Valley County Wind Energy Project.

The Montola/Sustainable Systems Project involves building a bio-diesel refinery near Culbertson in Roosevelt County, Montana. The facility is estimated to produce 15-20 million gallons of

seed-oil per year. It will provide permanent work to 31 full time employees with an average wage of $14 per hour.

Finally, the Yellowstone Ethanol LLC Power Plant is a 50-million-gallon-per-year ethanol plant (with the potential to produce up to 100 million gallons per year in future) to be built in North Dakota between Williston and Fairview. It is projected that the plant will cost $120 million and will generate 400 construction jobs ($6 million in construction wages) during the building phase and 40 permanent jobs (annual payroll in excess of $1.5 million) to maintain the plant. 18-20 million bushels of corn and up to 2 million bushels of barley or wheat will be needed per year to sustain the plant and the pulp byproduct from the plant will be enough to feed 250,000 feeder cattle.

2.4.3 Tourism

The analysis of employment by industry suggests that the tourism-related industries – accommodation and food services and arts, entertainment, and recreation – contribute over 1,000 jobs to the local economy. This sector's share of the study area's employment is about the same as the national scale, suggesting that the area gets its share of tourism dollars. The proportion of employment in tourism is smaller than the sector's share of the total employment of Montana. The state's relatively large tourism sector can most readily be attributed to two major destinations, Glacier and Yellowstone National Parks, and to mountain and wilderness activities in the state's mountainous, western region.

Table 2 – 22 lists Montana's top travel destinations. One of these, Fort Peck Lake, is located in the 6-county study area. Montana's Congressional Delegation has allocated more than $7 million to improve access roads to Fort Peck Lake fishing sites. These improvements may encourage greater visitation to Fort Peck Lake.

Some information about visitor spending shows that the area's tourism sector is remarkably strong in the "shoulder" seasons and in winter. Table 2-25 (in a later section of this report) reports findings from a study that indicates that the Richland County alone captures about six percent of the state's fall and spring season travel spending, and three percent of winter spending. The county captures less than one percent share of summer tourism spending. Hunting and related activities appear to be the area's greatest tourism advantage today, at least outside the Fort Peck Lake area.

Table 2-22: Top Travel Destinations in Montana

Destination	2003 Visitation Counts
Glacier National Park	1,664,046
Yellowstone National Park	1,539,881*
Little Bighorn Battlefield	422,566
Fort Peck Lake	**209,634**

National Bison Range	105,700

Source: Based on Table 14 from The Economic Review of the Travel Industry in Montana, 2004 Edition, Institute for Recreation and Tourism Research, University of Montana, July 2004.
** Figures reflect Yellowstone National Park visitors who enter the park from Montana only*

Other frequently visited attractions in the study area include:[7]

- Culbertson Museum and State Information Center;
- Wolf Point area and museum;
- Fort Union Trading Post; and
- Valley County Pioneer Museum and other museums in the area.

Specifically, the Lewis and Clark Trail and the Dinosaur Trail are popular among tourists traveling to the study area. Montana's Dinosaur Trail is a state-wide network of museums and dig sites that tourists can visit. Five of the thirteen sites are in the Missouri River Country area. In addition to the many dinosaur museums, some of the state's best fishing and camp sites are located along the 1,000 mile long Dinosaur Trail. The Montana's Northeastern Plains Birding Trail is another developed trail in the study area. The Big Sky Back Country Byway, which links the Yellowstone and the Missouri Rivers, also passes through the study area. The route is easy to travel and is well marked. There are various activities (i.e.: sightseeing, wildlife viewing, hiking, fishing, and hunting) along the route.

The McCone County Museum; Fort Peck Paleontology, Inc. and Dinosaur Field; Fort Peck Interpretation Center and Museum; the Pioneer Pride Museum (in Bainville); Sheridan County Museum; and Brush Lake State Park (in Plentywood) are among other tourist attractions in the study area. The Montana Cowboy Hall of Fame, which is currently under development, is designated to be built along US 2 in Wolf Point.

Potential natural tourist attractions, such as Medicine Lake and the Medicine Lake Wildlife Refuge, or the Missouri River in areas other than Fort Peck Lake, appear to be less frequently visited, although the specific data on the number of visitors was not readily available for this study.

The study area is part of the larger Missouri River Country, which includes Daniels, Garfield, McCone, Phillips, Richland, Roosevelt, Sheridan, and Valley Counties. About one-quarter of visitors to Montana travel through Missouri River Country. The majority of visitors to this region come for vacation purposes (as opposed to family/friend visits). Visitors to the region are most frequently coming from Washington, Minnesota, California, North Dakota, and Wisconsin, respectively. The top sited attractions for visitors to Missouri River Country are the mountains (48%), Glacier National Park (39%), open space (37%), and uncrowded areas (32%). The largest percentage of expenditures (35%) among visitors to the area was spent in retail, followed by gas and oil (23%). A total of about $52 million was spent by non-resident travelers in Missouri River Country as opposed to the over $1.58 billion that was spent state-wide.

Residents of Missouri River Country feel that the primary area for tourist development is Fort Peck Lake and its surrounding area. They also feel a need for improvements to current transportation conditions in the area, especially with regards to bus transportation.[8]

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[7] Information based on Chapter 2 from report *Attraction Visitors in Missouri River Country Travel Region*, Research report 2003-9, Institute for Recreation and Tourism Research, University of Montana, May 2003.

[8] See *Exploring Tourism Potential: Resident Attitudes in Missouri River Country, Montana*, University of Montana, Institute for Tourism and Recreation Research, Research Report 74, March 2000.

A more specific investigation into visitor characteristics to Richland County shows that less than one percent of visitors to the county spent at least one night. The majority of visitors to Richland County were visiting friends or relatives. The primary attraction to visitors of this county was hunting and the primary activity of interest was shopping. The majority of visitors were coming from Idaho, Wyoming, Washington, and North Dakota, respectively. Nearly all visitors to Richland County were repeat visitors and over half had lived in Montana in the past.[9]

Although a comprehensive study of the profile and role of tourism in the study area was not identified, related studies suggest that many visitors to the study area are just passing through and are on their way Glacier National Park.[10] This may explain a relatively limited role of tourism in the study area.

2.4.4 Retail Trade

Table 2 - 23 shows the number of establishments, sales, annual payroll, and employee numbers for the retail trade sector in the nation, state, and six-county study area. Table 2 - 24 further breaks down these statistics by county. As discussed in Section 2.3, the retail trade sector is the largest industry in Montana in terms of the number of establishments, and the second largest in terms of employment.

This table suggests that the six-county area gets somewhat less than its share of retail spending (at 3.15 percent), compared to the region's overall share of the states population (3.63 percent in 2005). It also suggests that retail establishments in the region are smaller than is typical in the state or nation: retailers in the area average 7.0 employees, compared to 10.3 in Montana and 13.1 in the nation as a whole.

Table 2-23: Retail Trade in the Six-County Study Area, the State, and the Nation, 2002

	Six-County Study Area	Montana	United States	Six-County Study Area as Percent of Montana	Montana as Percent of US
Establishments	235	5,145	1,114,637	4.57%	0.46%
Sales ($1000)	319,218	10,122,625	3,056,421,997	3.15%	0.33%
Annual Payroll ($1000)	26,843	988,009	302,113,581	2.72%	0.33%
Paid Employees	1,643	52,891	14,647,675	3.11%	0.36%
Population (2005)	33,928	935,670	296,657,000	3.63%	0.32%

Source: U.S. Census Bureau, 2002 Economic Census, and 2005 Population Estimates

[9] See *Niche News: Richland County Visitor Characteristics*, University of Montana, Institute for Tourism and Recreation Research, June 2004.

[10] See *Valley County Explores Tourism Potential*, the 1999 Montana Community Tourism Assessment Process, University of Montana, Institute for Recreation and Tourism Research, Research Report 71, January 2000.

Table 2-24: Retail Trade in the Six-County Study Area, 2002

	Daniels	McCone	Richland	Roosevelt	Sheridan	Valley	Total Six-County Study Area
Establishments	16	11	66	54	34	54	235
Sales ($1000)	20,009	11,488	104,540	83,386	26,233	73,562	319,218
Annual Payroll ($1000)	1,346	888	9,048	6,667	2,450	6,444	26,843
Paid Employees	89	58	528	419	183	366	1,643
Population (2005)	1,836	1,805	9,096	10,524	3,524	7,143	33,928
Per capita retail spending (est.)	$10,900	$6,365	$11,500	$7,925	$7,445	$10,300	$9,410

Source: U.S. Census Bureau, 2002 Economic Census, and 2005 Population Estimates

Table 2 – 24 shows that retail sales are a very important source of income to Richland County, with per capita spending estimated at $11,500 per capita. Retail spending is also relatively strong in Daniels and Valley counties.

Table 2 – 25 summarizes findings of a tourism study specific to Richland County. The study breaks down visitor spending into specific goods and services. Forty-eight percent of the $30 million spent by visitors to the region was spent in the retail trade sector.[11] This table also highlights an important seasonal aspect of the tourism industry. Tourism in Richland County alone represents 6 percent of the state's tourism market in the spring and fall, and three percent of the winter tourism spending, probably on hunting and related activities. By contrast, the county has less than one percent of the market in the summer season.

Table 2-25: Visitor Expenditure Distribution in Richland County

	Total Spending ($million)	% of State Total	Hotels, Lodging, Camping	Auto Rental, Repairs, Transp. Fees	Gasoline, Oil	Restaurant, Bar	Groceries, Snacks	Retail Sales	Misc. Services
Summer	$5.0	<1%	2%	3%	24%	16%	15%	30%	10%
Winter	$8.0	3%	0%	0%	29%	23%	10%	38%	0%
Shoulder	$18.0	6%	3%	0%	5%	12%	14%	58%	0%
Annual Total	**$30.0**	**2%**	**2%**	**0%**	**14%**	**16%**	**13%**	**48%**	**6%**

Source: Regional Nonresident Spending in Montana, Institute for Recreation and Tourism Research, University of Montana, March 2000, Table 8.2, page 40.

[11] Richland County was chosen as an example to illustrate the type and seasonality of tourist spending in the study area. This data was readily available from the University of Montana.

2.5 Labor Market

2.5.1 Employment, Unemployment, and Participation Rates

As shown in Table 2 - 26 below, total employment in the six-county study area is slightly less than 16,000 and accounts for about 3.4 percent of state employment, down from 4.1 percent over the ten years shown here, consistent with the declining population in the six-county study area. As the table shows, employment in the 6-county study area declined between 1996 and 2005. After a period of growth up to 1998, the area saw four years of losses totaling 2,254 jobs. Since 2002, however, the total employment figures show a substantial turnaround, with overall employment growth of 460 jobs.

Table 2-26: Employment in the Six-County Study Area

Year	Total Employment	Percent of State Employment	Year-to-year Percent change
1996	17,292	4.1%	
1997	17,302	4.0%	0.06%
1998	17,757	4.1%	2.63%
1999	17,740	4.0%	-0.10%
2000	16,260	3.6%	-8.34%
2001	15,830	3.5%	-2.64%
2002	15,503	3.5%	-2.07%
2003	15,529	3.4%	0.17%
2004	15,742	3.4%	1.37%
2005	15,963	3.4%	1.40%

Source: Bureau of Labor Statistics

Table 2 – 27 shows unemployment rates in the last 10 years in the six-county study area, all of Montana, and nationwide. The table shows that unemployment rates in the six-county study area tended be lower than those for the entire state or the entire country, except for in Roosevelt County, where the unemployment rate was higher for the years shown in the table and in Richland County, where the unemployment rates were higher between 1996 and 2000.

Table 2-27: Unemployment Rate in the Six-County Study Area (by County), State, and Nationwide

Year	Daniels County	McCone County	Valley County	Sheridan County	Roosevelt County	Richland County	Montana	United States
1996	2.4%	3.6%	4.5%	2.5%	10.6%	5.9%	5.5%	5.4%
1997	1.8%	3.4%	4.1%	2.8%	8.9%	5.2%	5.3%	4.9%
1998	2.7%	3.8%	4.4%	4.7%	9.1%	6.1%	5.6%	4.5%
1999	3.2%	3.7%	4.7%	5.7%	10.0%	7.1%	4.2%	4.2%
2000	4.3%	3.5%	4.3%	4.4%	7.0%	5.3%	4.8%	4.0%
2001	4.0%	2.8%	4.0%	3.8%	5.8%	4.6%	4.5%	4.7%
2002	4.1%	2.6%	4.0%	3.9%	5.9%	5.0%	4.4%	5.8%
2003	4%	3.2%	3.9%	4.0%	5.8%	4.4%	4.4%	6.0%
2004	3.9%	2.8%	4.2%	3.8%	6.4%	3.6%	4.4%	5.5%
2005	3.8%	3.6%	4.4%	3.4%	7.1%	3.7%	4.4%	5.1%

Source: Bureau of Labor Statistics

However, a low unemployment rate does not necessarily imply a good performance of the local economy. A low unemployment rate may also result if unemployed individuals who cannot find a job stop looking for a job and drop off the labor force, or if individuals who are not working are not actively looking for a job (maybe because they are discouraged by a personal experience or that of a friend or family member) or because of out-migration. As Table 2 - 28 shows, labor force participation in the Six-county study area in year 2000 was lower than on average in Montana and nationwide.[12] This observation applies to both the entire working-age population as well as working-age females and is consistent with the "discouraged worker" hypothesis.

Table 2-28: Employment Status of Population in the Six-County Study Area, Montana, and Nationwide, in Percent of Working-Age Population, 2000

Employment Status Characteristic	6-County Study Area Total	Montana	United States
Participation in Labor Force, Total Population	62.2%	65.4%	63.9%
Employed, Total population	57.2%	60.8%	59.7%
Participation in Labor Force, Females	56.4%	59.9%	57.5%
Employed, Females	52.7%	56.6%	54.0%

Source: U.S. Census Bureau, 2000 Census

It should be noted, however, that participation rates in the six-county study area increased considerably over the period from 1990 to 2000, particularly for females (see Table 2 - 29). This is consistent with the trends in Montana and the United States.

Table 2-29: Employment Status of Population in the 6-County Study Area, Montana, and Nationwide, in Percent of Working-Age Population, 1990

Employment Status Characteristic	Six-County Study Area Total	Montana	United States
Participation in Labor Force, Total Population	61.1%	63.7%	65.3%
Employed, Total Population	56.2%	58.5%	60.3%
Participation in Labor Force, Females	51.3%	55.8%	56.8%
Employed, Females	47.8%	52.2%	53.1%

Source: U.S. Census Bureau, 1990 Census

[12] Comparison with more recent data on participation in employment in the study area would be more appropriate here from analytical point of view. However, such data was not available at the time of writing this report.

2.5.2 Educational Attainment

Table 2 - 30 shows that the typical level of education in the six-county study area was a high school diploma or college without degree, with almost 60 percent of adults aged 25 and over achieving one of these levels of education. In comparison, 56.9 percent of population aged 25 and over in the entire state of Montana and 49.6 percent in all of United States attained this level of education. On the other hand, the percentage of population with a bachelor's, graduate, or professional degree was, on average, smaller than in Montana and the nation. In the six-county study area, only about 16.3 percent of adults 25 years and over achieved this level of education as compared to 24.4 percent in both Montana and the United States.

Table 2-30: Educational Attainment in the Six-County Study Area, Montana, and Nationwide, as Percent of Population 25 and Over

Educational Level	6-County Study Area Total	Montana	United States
Less than 9th grade	7.4%	4.3%	7.5%
9th to 12th grade, no diploma	9.8%	8.6%	12.1%
High school graduate (includes equivalency)	35.3%	31.3%	28.6%
Some college, no degree	24.4%	25.6%	21.0%
Associate degree	6.7%	5.9%	6.3%
Bachelor's degree	13.0%	17.2%	15.5%
Graduate or professional degree	3.3%	7.2%	8.9%

Source: U.S. Census Bureau, 2000 Census

2.6 Existing Economic Development Plans and Emerging Trends

2.6.1 Agriculture

Growth in agriculture is vital for economic growth in Montana. There have been talks of some projects in the Fort Peck area, including an irrigation project and the possibility of growing camelina crops for use in bio-diesel production.

Conversations with representatives within the Fort Peck tribe reveal that the tribes could increase irrigation of their crop land. The tribe was granted water rights to divert up to approximately 1,000,000 acre feet of water per year from the Missouri river. If this amount of water was actually diverted it would create the possibility of irrigating up to 450,000 acres of cropland. The only limitation to the magnitude of this irrigation project is the number of acres of tribal-owned land suitable for crop production. With water values at $200 per acre foot, the tribe could potentially earn $200,000,000 per year if they were able to fully utilize their water rights.

Additionally, as the possibility of bio-diesel production comes closer to reality, the camelina seed is a better producer of oil for development of bio-diesel than Canola Oil. The Fort Peck

area has long grown seed for Canola Oil. Yet there are some difficulties in growing camelina, as the area is not equipped to mass produce this seed crop (the ground needs to be prepared differently, the harvesting of the crop done differently, and special equipment is needed to efficiently handle this crop). Thus, there may need to be a commitment to development of bio-diesel before mass production of camelina would be viable.

2.6.2 Energy

Various energy projects have been proposed in the study area. There have been talks of a bio-diesel production facility in conjunction with Sustainable Systems, which would be located in Culbertson (Roosevelt County). Additionally, the building of an ethanol production plant in Oswego (Valley County) and an oil refinery outside of Culbertson have been discussed. There is also the possibility that the old oil refinery located at the intersection of US 2 and MT 13, just west of Wolf Point, will be re-established.

Several energy projects in the study area have already been approved, including a coal-fired power plant near Circle (which should be ready in the next 10 years) and a wind project in Valley County.

In addition, there has been a recent renewed interest in oil exploration in the study area (especially in Richland County). On a national level, Alberta has recently seen substantial economic growth as a result of oil & gas and oil sands projects. Such projects account for the majority of economic growth in this region. There is great potential for growth in the future because of the substantial oil sands deposits in Alberta.

Oil exploration and extraction activities would increase truck traffic in the area because the oil pipeline is already functioning at capacity, shipping oil out of Canada to points south for refining. The only alternative to pipeline is trucking, which is very costly (up to $20 per barrel). There is need for additional capacity in oil transport. The current lack of oil transport infrastructure has forced some oil companies to shut down their wells while waiting for additional transport capacity or for a refinery to open in the region. Development of an oil refinery in the region would be highly beneficial.

2.6.3 Tourism

Fort Peck tribal officials have put a growing importance on the tourism industry and there have been talks of developing a destination resort in the area. In addition, as discussed in section 2.4.3, road improvements in the Fort Peck Lake area may encourage tourism.

Also, there have been recent developments to the portion of the Dinosaur Trail in the study area. The Dinosaur Trail is one of the major tourist attractions in the region.

2.6.4 Transportation

It is projected that there will be an increase in truck traffic in the study area in the near future. First, with the trend towards consolidating grain loading facilities, trucks will need to haul loads to the 110-rail-car loading facilities in Wolf Point and Macon, which can process 170 semi trucks per day. Also, should a bio-diesel production facility open in Roosevelt County, it would

need adequate seed to crush, likely requiring imports from Canada. Transporting these imports would potentially increase truck traffic in the study area.

US-Canadian border crossings in Montana and North Dakota ports grew by about 2.5 percent annually in the 1994-2003 period. Since then, the growth in crossings have markedly accelerated. Port of Raymond officials have observed a significant increase (on the order of 200%) in oil and gas trucks in the recent months; current oil related traffic entering through the Port of Raymond is about 35-50 trucks per day.

Currently, there are about 50-100 trucks/day crossing the border in the winter, and 100-250 trucks/day crossing the border in the summer. Also, with the present price of diesel being much cheaper in the US than in Canada (by at least $1/gallon), trucks traveling east to west in Canada often come across the border and travel across US highways and then go back into Canada at their final destinations. Finally, the development of oil fields in Alberta and Saskatchewan may generate truck traffic with the southern United States, including Texas, where numerous oil production companies and facilities are currently operating.

With the shift in trade movement from the rail infrastructure that runs east-west to a more north-south movement, trucking has become a necessary means of transport. Trucks traveling from Saskatchewan to destinations in the Midwest have the option of crossing at the Port of Raymond (Montana's third largest port) or at the Port of Portal (North Dakota's second largest port). There are time incentives for trucks to cross at the Port of Raymond rather than at the Port of Portal due to potential processing delays. However, the distance is slightly greater using Raymond than Portal. If cross-border trucking increases, time delays at the Port of Portal could intensify and make truckers more likely to choose to cross at the Port of Raymond if that is cost-effective based on their destinations.

When MT 16 was rebuilt from Culbertson to Sidney, there was a large increase in truck traffic at the Port of Raymond, possibly due to improvements to this segment. And, a few years ago, the Canadians improved their side of the highway, which resulted in a large increase in truck volume. However, the road is already wearing, which will decrease truck volumes if proper repairs are not made. Canadian Highway 6 to Regina would be a good link in this system, connecting with MT 16 to Glendive and then I-90. This would be the most direct route to the US Interstate system from the Province of Saskatchewan via a 24-hour port.

2.6.5 Others

There are various other economic opportunities being discussed in the area. First, there have been talks of a possible Fed Ex hub in Plentywood to reduce the time it takes to ship across the Canadian border. Also, there is speculation that the widening of US 2 and MT 16 would lead to the possibility of 2 or 3 additional duty free providers on either side of the Port of Raymond. Improved road conditions would likely reduce freight rates, which could provide various economic opportunities.

Some also report that safety is an issue that is currently hindering growth in the area. The variation in speed between cars and trucks is a problem on narrow two-lane roads without passing lanes. Widening US 2 could improve tourism and improve the possibility of businesses locating in the study area.

Finally, the Municipal and Rural Water Pipeline project (MR&I) is a project designed to provide a high quality and safe drinking water supply in the area. Using the existing Culbertson water treatment plant, the communities of Froid and Medicine Lake were connected to the regional system last year. In 2006, the community of Bainville and surrounding rural hookups will be added to the system. On the Fort Peck Reservation, the Tribe has completed construction of a water intake and transmission line to the location of the systems central water treatment facility. The Tribe is in the process of bidding the construction of the treatment plant at this time. At completion, the Fort Peck / Dry Prairie Regional Water System will provide service to communities and rural farmsteads north of the Missouri River, to the Canadian Boarder and from the North Dakota state line west to a boundary that lies just west of Glasgow. Ground water in this region is poor and heavily mineralized. In some areas, nitrates have been measured above levels that are safe for human consumption. In other areas, oil exploration activities have affected ground water quality. Through centralized treatment of Missouri River water, high-quality and safe drinking water will be supplied to the region. With the water comes increased possibility of growth.

3: TRANSPORTATION CHARACTERISTICS, ACCESS, AND PERFORMANCE ISSUES

This section provides an overview of the transportation network, traffic, and performance issues in Montana and the study area to shed light on the role of transportation in the local economy.

3.1 Existing Transportation Network and Its Characteristics

3.1.1 Transportation Network and Key Routes

Road Network

Table 3 - 1 shows the length of the road network in Montana and nationwide. The vast majority of roads in Montana are rural roads. Urban roads account for just 4.1 percent of all lane-miles of roads. This is much less than the national average of 26.4 percent.

The lane-miles of urban roads in Montana increased over the period from 2000 to 2004, and the lane-miles of rural roads decreased slightly. The total lane-miles of both rural and urban roads in Montana remained virtually unchanged during the four year period. Similar trends were observed nationwide. However, total lane-miles of roads have increased by 1.4 percent during the same period.

Table 3-1: Lane Miles of Roads in Montana and Nationwide

Geographic Area	Lane-Miles of Roads, 2000			Lane-Miles of Roads, 2004			Rate of Growth 2000-2004	Percent Urban in Total, 2004
	Rural	Urban	Total	Rural	Urban	Total		
Montana	136,656	5,321	141,977	135,923	5,854	141,777	-0.1%	4.1%
United States	6,308,213	1,915,180	8,223,393	6,139,666	2,199,155	8,338,821	1.4%	26.4%

Source: Highway Statistics, 2000 and 2004 issues

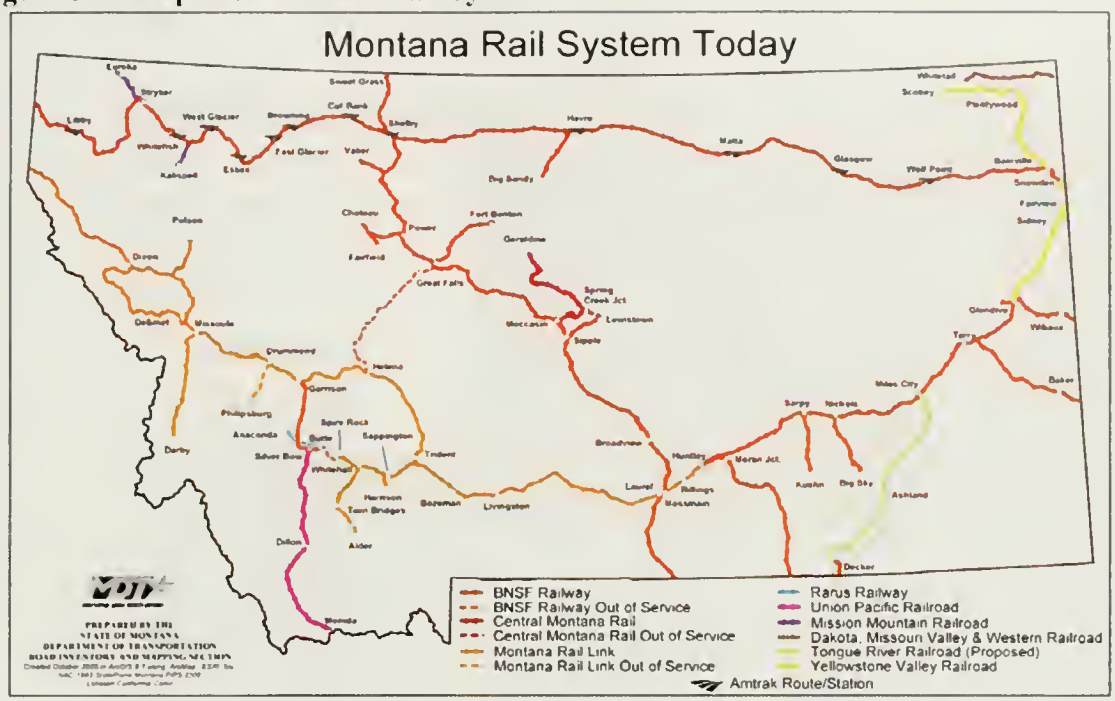
The major transportation route in the study area is the US 2 route which runs west to east parallel to the Missouri River. The route crosses Valley County and Roosevelt County. Another key highway is Montana Highway 16, which runs north-south through Richland, Roosevelt and Sheridan Counties and crosses US 2 at Culbertson. Both US 2 and MT 16 are on the National Highway System.

Other highways in the study area include Montana Highway 13, Montana Highway 24, and Montana Highway 200. The remaining roads in the study area are smaller, typically local and unpaved roads.

Rail Network

The study area is covered by three major railway routes: BNSF Railway, the Yellowstone Valley Railroad (YSVR), and the Dakota Missouri Valley and Western (DMVW) (see Figure 3 - 1).

Figure 3-1: Map of Montana's Rail System



The BNSF line runs parallel to US 2. The YSVR route is comprised of two segments totaling 171 miles. The northern segment, known as the "Scobey Line," interchanges with the BNSF at Bainville and travels north to Plentywood and Scobey. The southern segment, known as the "Sidney Line," travels in the vicinity of MT 16 between two BNSF interchange points, Glendive and Snowden. Finally, the DMVW route runs from west to east connecting Whitetail and Westby in the northern part of the Daniels and Sheridan County near the border with Canada.

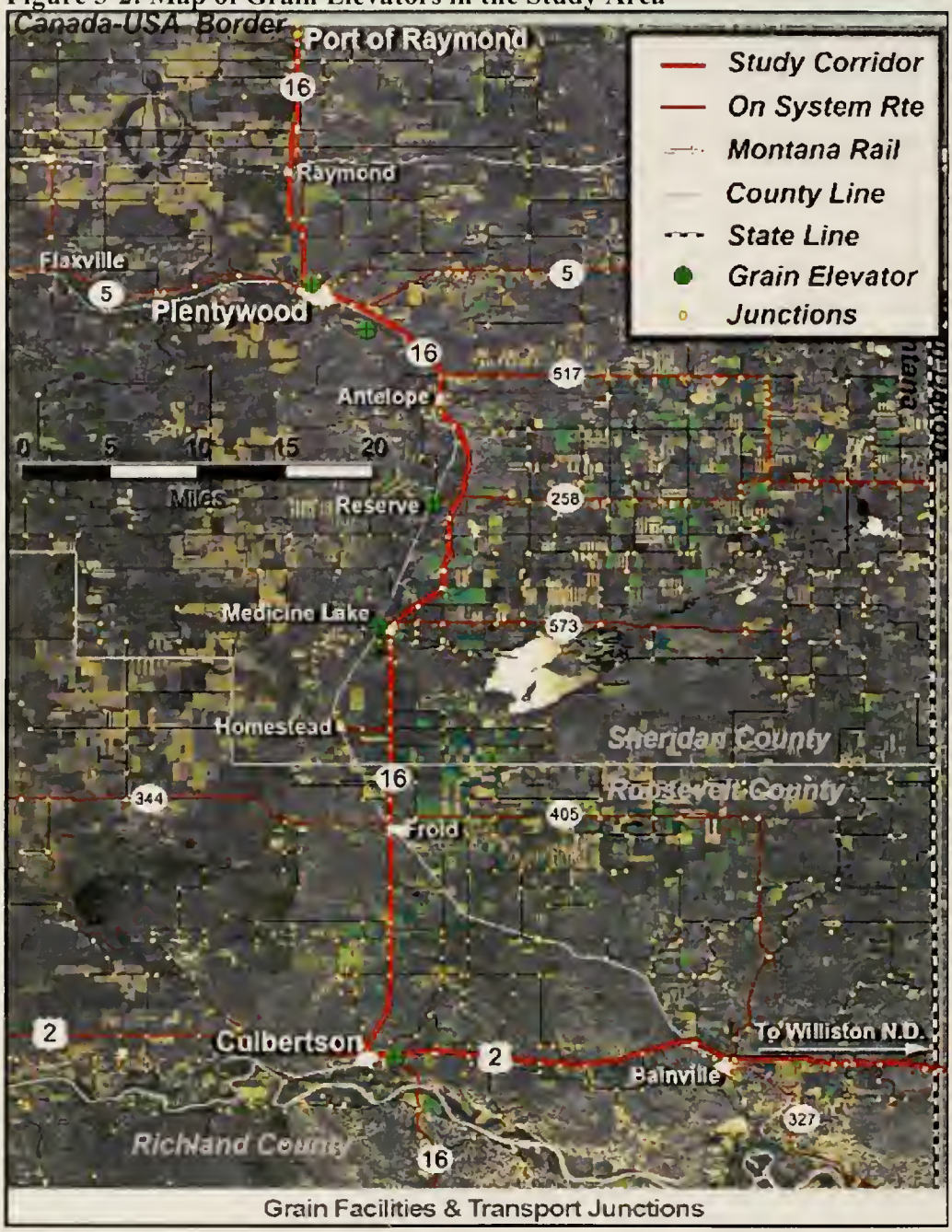
It is evident from Figure 3 - 1 that most of the rail line is laid east to west. This is because, historically, the majority of freight movement was in this direction. However, there has been a growth in north-south freight movement in recent years, particularly because of the North American Free Trade Agreement (NAFTA). The increased north-south traffic will inevitably lead to increased truck traffic since existing rail cannot adequately serve movement of freight in this direction and new cross-border rail lines are unlikely because of cost and security issues.

Another problem with using rail as a means of transport in Montana is the high cost. The main factor contributing to high rail rates in the state is the lack of competition. In Montana, there is very limited rail competition as a result of BNSF controlling over 90 percent of rail use.

In June 2005, BNSF announced an increase in the shipping rate on grain loaded at 52-car elevators. Very often, the elevators located most closely to farms are 52-cars, as opposed to the larger 110-car grain elevators. However, after only a few months, this decision was reversed because of high opposition to the new rules. Still, rates are higher at 52-car loading facilities than at 110-car loading facilities. Potential future rate increases at 52-car grain elevators could force numerous loading terminals to shut down and cause many job losses.

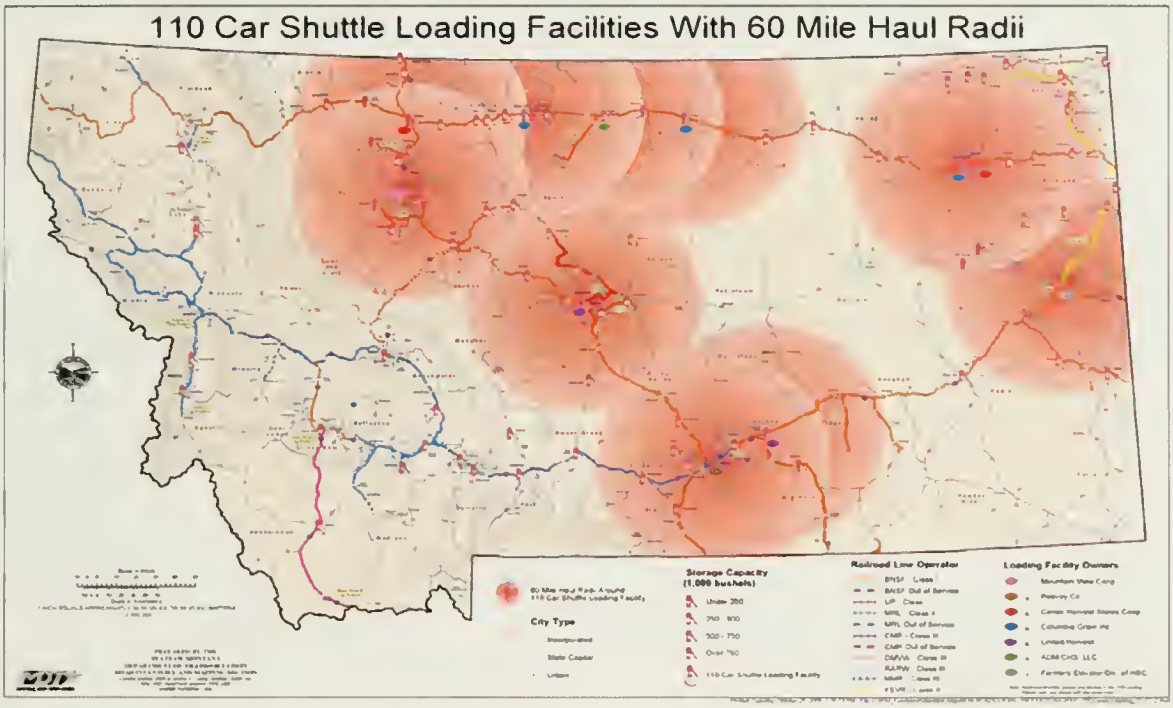
Figure 3 - 2 shows a map of the grain elevators in the study area.

Figure 3-2: Map of Grain Elevators in the Study Area



There has been an increasing trend toward the use of shuttle trains (see Figure 3 - 3). Shuttle trains (a.k.a. unit trains) are high-capacity freight trains consisting of only a single product. Newer shuttle trains typically consist of 110 cars and enable more efficient and cheaper rail transport. In Montana, they are predicted to be very important in ensuring the feasibility of wheat export in the near future. However, as can be seen in Figure 3 - 3, there are currently only 11 shuttle loading facilities in the state and 2 within 60 miles of the study area (though there are plans to build another facility in Culbertson). The need to haul shipments farther to get to the loading facility has resulted in an increase in truck traffic on highways. A case study conducted in North Dakota showed that large shuttle-train elevators may generate up to 40,000 loaded and empty truck trips per year.[13] With much truck traffic concentrated at harvest season, a 110 car shuttle facility could generate 225 truck trips per day.

Figure 3-3: Location of Shuttle Facilities in Montana



With regards to passenger train service, Amtrak's Empire Builder provides daily passenger train service in the Midwest and Northwestern US. The Empire Builder route passes through Northern Montana along the Hi-Line (parallel to US 2).

Other Transportation

There is an extensive network of oil pipelines in the study area. Pipelines originate and cross through Sheridan, Roosevelt, and Richland Counties, the three counties in the study area with the highest oil production (see Table 2 - 19).[14]

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[13] See *Trip Generation Rates for Large Elevators: A North Dakota Case Study*, Tolliver, Dybing, and Mitra, January 2006

[14] Based on a 1987 map of oil and gas fiend and pipelines produced by the Montana Oil and Gas Board.

The study area is less accessible by air. Although there are airports in many local communities, some airports have relatively short runways, unpaved runways, or no officially published instrument approach procedure. The airports with at least a 5000 feet paved runway are in Sidney and Wolf Point. Other airports with a paved runway are in Glasgow, Poplar, Plentywood, and Scobey.[15] In addition, Big Sky provides commercial air service to Wolf Point and Sidney with financial assistance from the Essential Air Service Program.

3.1.2 Highway Traffic and Congestion

Table 3 - 2 shows highway traffic characteristics for Montana and all of the United States. The table indicates that over the period from 2000 to 2004, highway travel, as measured by annual vehicle miles of travel, increased by 12 percent on rural roads and 11.2 percent on urban roads. Even though the share of travel by trucks in Montana is marginally lower than the national average, it is growing at a faster rate in Montana than in the US. In 2004, the share of trucks in traffic on rural roads in Montana amounted to 13.2 percent, and the share of trucks on urban roads amounted to 4.6 percent. In the same year, the national share of trucks in traffic amounted to 15.6 percent on rural roads and 7.7 percent on urban roads. However, Montana's share of trucks in traffic in urban areas is increasing at a much faster rate than the national average.

Table 3-2: Highway Traffic Characteristics in Montana and Nationwide

Measure of Travel	Montana			U.S.		
	2000	2004	2000-2004 Growth Rate	2000	2004	2000-2004 Growth Rate
Annual Vehicle-Miles of Travel (Millions) - Rural	7,590	8,627	12.0%	1,084,961	1,070,248	-1.4%
Percent Trucks	14.2%	13.2%	-7.6%	14.8%	15.6%	4.9%
Annual Vehicle-Miles of Travel (Millions) - Urban	2,292	2,580	11.2%	1,664,842	1,892,265	12.0%
Percent Trucks	2.9%	4.6%	37.0%	7.0%	7.7%	9.7%
Annual Vehicle-Miles of Travel (Millions) - Total	9,882	11,207	11.8%	2,749,803	2,962,513	7.2%
AADT per Lane (State-Agency Owned Road System), Total Urban and Rural*	1,023	1,041	1.7%	2,693	2,833	4.9%

Source: Highway Statistics, 2000 and 2004 issues
** AADT stands for Annual Average Daily Traffic.*

The increase in traffic on urban roads is much in line with the national average. However, the increase in travel on rural roads between 2000 and 2004 in Montana contrasts with the decreasing trend in the US. It should be noted, however, that despite the fact that there has been a rather large increase in traffic in Montana, road congestion in the state still remains at very low levels.

[15] Based on information from website www.aircraft-charter-world.com.

Figure 3-4: Typical Congestion Levels in the Study Area, Winter Times

Looking ahead to Table 3 - 3, it can be seen that the large majority of roadways in Montana have a very low volume-service flow ratio (the volume-service flow ratio is used to calculate level of service). The last row in Table 3 - 2 shows that the Average Annual Daily Traffic (AADT) per lane in Montana amounts to less than 50 percent of the national AADT per lane. The national AADT per lane was also growing at a faster rate than in the state. Over the period from 2000 to 2004, AADT per lane in Montana increased by 1.7 percent, compared to 4.9 percent nationwide.

Table 3 - 3 shows the roadway characteristic and traffic and congestion levels on the portions of US 2 and MT 16 in the study area. The study area does not have a lot of traffic compared to the many other areas in Montana. The portions of US 2 and MT 16 in the study area are two lanes. In general, in the study area, the shoulder width on US 2 is wider than that on MT 16 and there is more traffic on US 2. Congestion levels are low for all segments of US 2 and MT 16 in the study area.

Table 3-3: Highway Traffic Characteristics in the Study Area

Measure of Travel	Total Study Area	US 2		MT 16		
		Valley	Roosevelt	Sheridan	Roosevelt	Richland
Total Segment Length	241.24	79.73	86.04	44.99	17.21	13.26
Average Number of Lanes	2.03	2.09	2.02	2	2	2
Average Shoulder Width*	4-5	5-6	4-5	4-5	3-4	1-2
Average AADT	1,484	1,603	1,692.35	1,040	916	1,657
Average AADT/Lane	722	753	836	520	458	828
Average V/C Ratio **	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1

Source: Montana Department of Transportation
** Shoulder width reported is the width of one shoulder (the left or right)*
*** The ratio of traffic volume (number of vehicles) on a roadway to the roadway's vehicle capacity; used to calculate level of service; capacity constraint assumption for rural 2-3 lane road: 1,500 vehicles/hour/lane (assuming no significant nighttime traffic)*

Table 3 - 4 shows the distribution of the National Highway System in Montana and all of the United States across various ranges of volume-service flow ratios. The table demonstrates that less than 1 percent of road length in Montana exceeds the volume-service flow ratio of 0.7 (a ratio in excess of 0.7 implies increased road congestion and possible slow-downs in traffic). In contrast, in 2004, 13.3 percent of all roads in the United States had a volume-service flow ratio of 0.7 or larger.

Table 3-4: National Highway System by Volume-Service Flow Ratios, Percent of Total Road Length Falling into each Range of Volume-Service Flow Ratio

Geographic Area	Year	Volume-Service Flow Ratio					
		<0.21	0.21-0.40	0.41-0.70	0.71-0.79	0.80-0.95	>0.95
Montana[1]	2000	80.5%	16.4%	2.7%	0.3%	0.1%	0.0%
	2004	73.9%	23.1%	2.8%	0.1%	0.1%	0.0%
U.S. Total	2000	32.7%	32.2%	23.1%	3.6%	4.3%	4.2%
	2004	30.5%	33.8%	22.5%	3.5%	5.0%	4.7%

Source: Calculated based on Highway Statistics, 2000 and 2004 issues
[1] Used as a proxy to estimate volume-service flow in the study area.

3.2 Commercial Shipments in Montana

3.2.1 Origin and Destination of Commercial Shipments

Table 3 - 5 shows the structure of commercial shipments in Montana. The table demonstrates that both in terms of value of shipments as well as tonnage, the vast majority of shipments originating in Montana and the vast majority of shipments with Montana destinations are domestic shipments. In other words, cross-border shipments and international shipments account for a rather small fraction of all shipments to or from Montana.

Table 3-5: High-Level Structure of Montana Commercial Shipments

Category of Shipment	Value of Shipments (Millions of Dollars)	Tonnage of Shipments (Thousands of Short Tons)
Shipments Originating in Montana		
Domestic Shipments	$27,315.7	131,024.3
Cross-border Shipments	$264.6	1,107.4
Overseas Shipments	$207.9	3,549.8
Total Shipments Originating in Montana	**$27,788.2**	**135,681.5**
Shipments with Montana Destinations		
Domestic Shipments	$28,532.3	68,912.9
Cross-border Shipments	$1,862.2	9,726.8
Overseas Shipments	$980.9	331.9
Total Shipments with Montana Destinations	**$31,375.4**	**78,971.6**

Source: Extracted from 2002 Freight Analysis Framework (FAF) Database for Montana, Federal Highway Administration

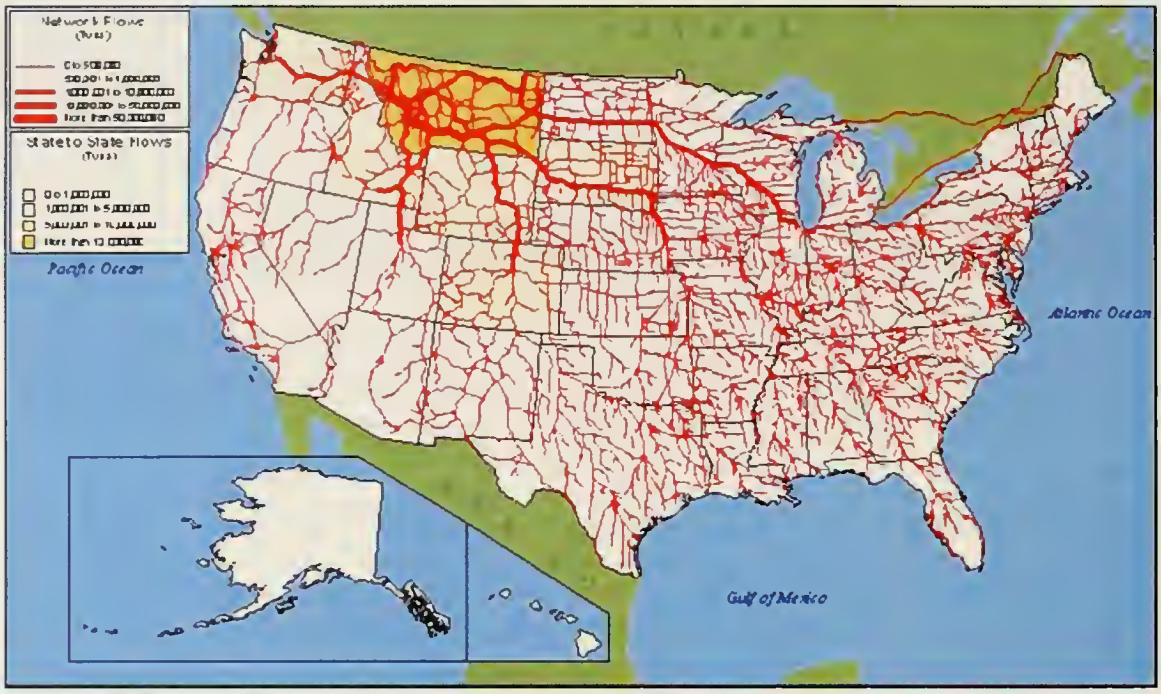
Table 3 - 6 and Table 3 - 7 show the states where the shipments from Montana are going to and where shipments with Montana destinations are coming from (see Figure 3 - 5 for an illustration of total truck flows).

The tables demonstrate that about half of all commercial shipments in Montana are shipments with both their origin and destination in Montana. Specifically, 57.3 percent of shipments in terms of value and 45.4 percent in terms of tonnage originating in Montana are shipped to another location in Montana. At the same time, 54.9 percent of shipments in terms of value and as much as 86.3 percent in terms of tonnage that are shipped to Montana locations also originate in Montana.

It is evident from Figure 3 - 5 that there are a wide variety of destinations for shipments out of Montana and origins for shipments into Montana. There is a significant amount of freight movement on the interstate. There is also some freight movement on US 2, though not as

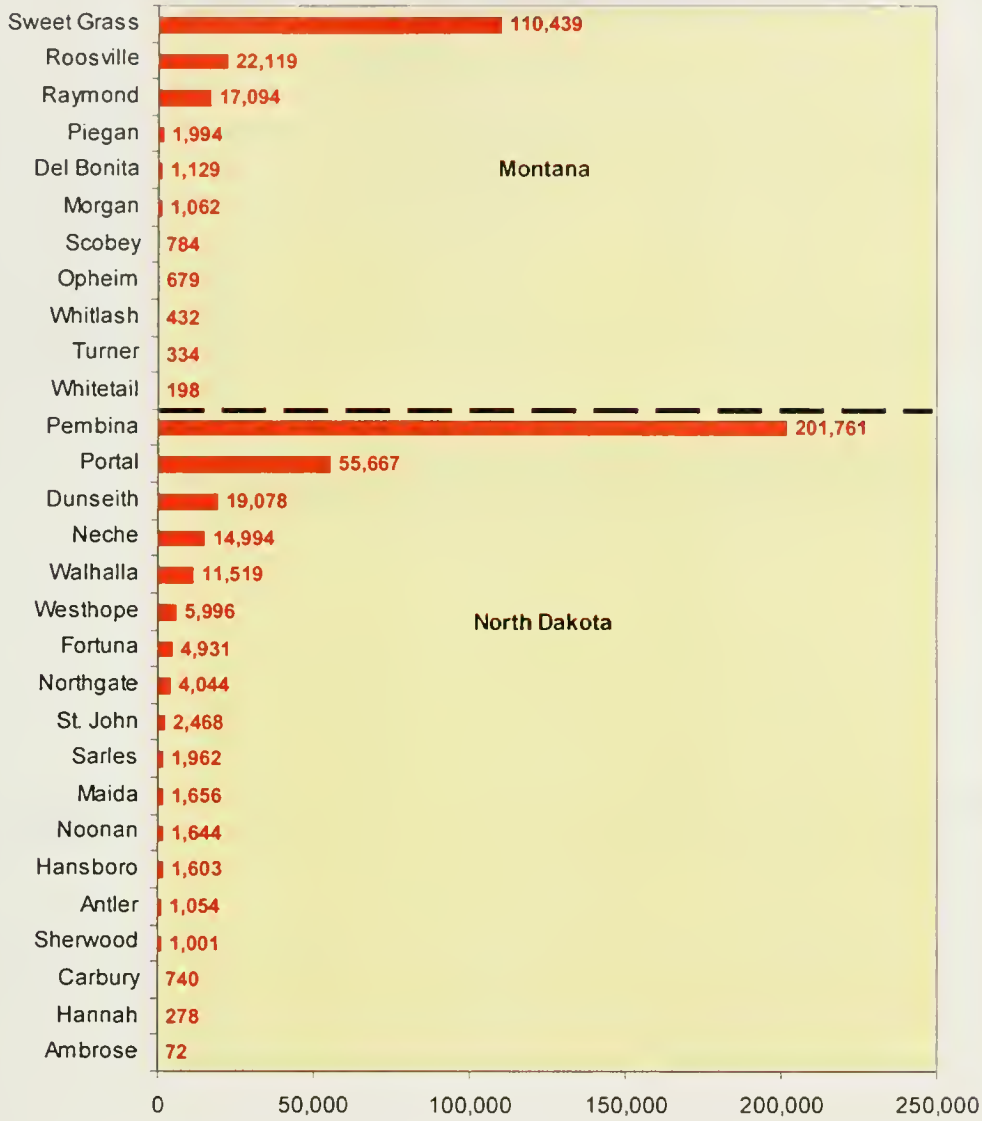
significant an amount as on the Interstate System. The most significant amount of freight is moved east to west as opposed to north to south. Figure 3 - 6 shows the truck flows through Montana and North Dakota ports of entry.

Figure 3-5: International and Domestic Truck Flows In and Out of Montana



Source: Federal Highway Administration, Freight Analysis Framework
** The map only shows truck flows along routes covered by FHWA's traffic assignment process. Because of their functional classification, many of the north-south routes along the Canadian border are not represented in FHWA's framework.*

Figure 3-6: Number of Annual Incoming Trucks from Canada to MT or ND Ports



Source: US Customs and Border Protection 2003

Table 3-6: Destinations of Domestic Shipments Originating in Montana

Destination State	Value of Shipments as Percentage of Total	Tonnage of Shipments as Percentage of Total
Montana	57.3%	45.4%
Nevada	19.6%	13.3%
Wyoming	3.1%	0.9%
Idaho	2.2%	1.1%
California	2.1%	1.2%
Minnesota	1.8%	11.6%
Illinois	1.5%	4.9%
Wisconsin	0.9%	9.5%
Other States	**11.5%**	**12.1%**

Source: Extracted from 2002 Freight Analysis Framework (FAF) Database for Montana, Federal Highway Administration

Table 3-7: Origins of Domestic Shipments with Montana Destinations

Origin State	Value of Shipments as Percentage of Total	Tonnage of Shipments as Percentage of Total
Montana	54.9%	86.3%
Washington	5.0%	1.6%
New Jersey	5.2%	0.1%
Utah	2.6%	0.9%
Wyoming	2.4%	3.3%
Colorado	2.3%	2.1%
Indiana	2.3%	0.1%
Other States	**25.2%**	**5.7%**

Source: Extracted from 2002 Freight Analysis Framework (FAF) Database for Montana, Federal Highway Administration
** For an alternative breakdown of this data, refer to Table A-2 in Appendix A*

For shipments originating in Montana, the largest share of shipments going out-of-state have destinations in Nevada, Wyoming, Idaho, and California (with 19.6 percent, 3.1 percent, 2.2 percent, and 2.1 percent of shipment value, respectively). Other states account for less than 2 percent of total value of shipments. The distribution of shipments is somewhat different when the tonnage of shipments is considered. In terms of tonnage of shipments, Nevada, Minnesota, Wisconsin and Illinois have the largest share of total shipments (13.3 percent, 11.6 percent, 9.5 percent, and 4.9 percent, respectively).

For shipments destined for Montana, the largest shares of shipments are coming from Washington, New Jersey, Utah, Wyoming, Colorado, and Indiana (5 percent, 5.2 percent, 2.6 percent, 2.4 percent, 2.3 percent, and 2.3 percent of shipment value, respectively). According to the 2002 FAF database, trade flows from New Jersey to Montana are comprised primarily of printed products, furniture, mattresses and illuminated signs, and mixed freight.

3.2.2 Shipments Crossing the US – Canadian Border

Table 3 - 8 shows the number of incoming trucks from Canada to all Montana and North Dakota ports and Figure 3 - 7 shows a map of these ports with hours of operation. In the table, the main ports of interest to this study are highlighted with bold font, North Dakota ports in close proximity to the study area are highlighted in blue, and the major ports of entry are bold. Sweet Grass, the only port in Montana on an Interstate, has the largest percentage of truck traffic of all of the ports in the state. The Port of Raymond, in the study area, is Montana's third largest port by traffic. Portal, the second largest port in North Dakota, is in close proximity to the study area. Both Raymond and Portal are 24-hour ports of entry.[16]

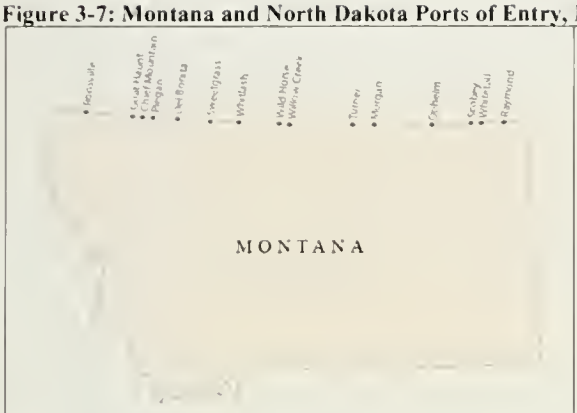
[16] Opposite Raymond, on the Canadian side, hours of operation for commercial traffic at the Port of Regway are limited to 8:00AM to 5:00PM, Monday through Friday (except holidays). This limited service may constrain growth in north-bound movements at this location. North Portal, opposite Portal operates 24 hours a day, 7 days a week. Source: Canada Border Services Agency, http://www.cbsa-asfc.gc.ca/contact/listing/offices/office616-e.html.

Table 3-8: Incoming Trucks from Canada to All Montana and North Dakota Ports

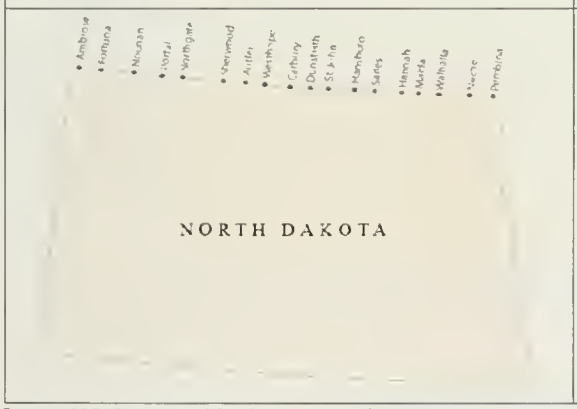
Port Name	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	% of State (2003)	Mean Growth Rate	AACG
Montana, All	**130,046**	**132,845**	**148,483**	**156,900**	**165,764**	**182,563**	**205,577**	**198,215**	**188,195**	**156,264**		2 49%	2 06%
Del Bonita, MT	1,080	607	697	826	1,096	550	865	1,164	1,138	1,129	0 7%	6 80%	0 49%
Morgan, MT	1,586	1,518	2,058	1,955	1,735	1,941	3,270	3,783	1,469	1,062	0 7%	2 46%	-4 36%
Opheim, MT	716	584	717	506	547	901	2,047	2,556	1,175	679	0.4%	11 50%	-0 59%
Piegan, MT	2,092	2,269	2,054	2,249	2,264	2,406	2,466	2,682	1,855	1,994	1.3%	0 37%	-0 53%
Raymond, MT	**15,475**	**14,331**	**14,785**	**16,940**	**17,020**	**17,345**	**17,907**	**21,018**	**17,283**	**17,094**	**10.9%**	**1.61%**	**1.11%**
Roosville, MT	17,542	19,618	22,540	20,875	22,289	30,907	30,870	24,308	27,416	22,119	14 2%	4 10%	2 61%
Scobey, MT	171	363	495	331	149	294	579	1,090	997	784	0 5%	34 79%	18 43%
Sweet Grass, MT	**89,530**	**91,438**	**104,110**	**111,962**	**120,084**	**127,468**	**146,162**	**140,233**	**135,879**	**110,439**	**70.7%**	**2.86%**	**2.36%**
Turner, MT	719	647	407	703	410	333	620	554	285	334	0 2%	1 04%	-8 17%
Whitetail, MT	58	120	140	106	78	243	251	264	257	198	0 1%	29 70%	14 62%
Whitlash, MT	1,077	1,350	480	447	92	175	540	563	441	432	0 3%	17 11%	-9 65%
North Dakota, All	**266,552**	**257,926**	**270,583**	**301,326**	**307,081**	**325,212**	**344,524**	**360,486**	**350,409**	**330,468**		2 55%	2 42%
Ambrose, ND	466	534	395	270	142	115	168	231	191	72	0 0%	-11 73%	-18 74%
Antler, ND	1,090	830	683	1,252	1,300	832	1,058	1,584	1,548	1,054	0.3%	5 81%	-0 37%
Carbury, ND	2,430	2,151	1,575	2,638	2,067	1,613	1,780	1,890	1,119	740	0 2%	-8 06%	-12 38%
Dunseith, ND	19,439	13,957	16,953	19,050	17,371	18,406	18,321	19,753	21,522	19,078	5 8%	0 86%	-0 21%
Fortuna, ND	2,888	2,672	3,886	4,094	3,121	3,222	3,305	4,657	4,910	4,931	1.5%	8 01%	6 12%
Hannah, ND	400	433	279	359	201	178	353	254	290	278	0 1%	2 91%	-3.96%
Hansboro, ND	822	1,135	1,421	1,307	907	1,157	1,764	1,760	1,505	1,603	0 5%	10 72%	7 70%
Maida, ND	2,057	1,199	1,145	1,185	1,079	1,227	1,429	1,542	1,978	1,656	0 5%	-0 18%	-2 38%
Neche, ND	12,031	8,909	9,687	10,543	11,482	12,713	11,361	12,211	15,670	14,994	4 5%	3 57%	2 48%
Noonan, ND	1,575	1,403	1,766	1,391	1,368	1,037	1,289	1,848	2,344	1,644	0 5%	3 61%	0 48%
Northgate, ND	12,347	12,097	9,579	6,724	2,554	2,958	3,227	5,515	4,103	4,044	1 2%	-5 10%	-11 66%
Pembina, ND	**127,204**	**143,441**	**140,627**	**152,110**	**177,916**	**200,456**	**214,377**	**219,733**	**203,416**	**201,761**	**61.1%**	**5.53%**	**5.26%**
Portal, ND	**52,729**	**50,983**	**59,500**	**74,126**	**66,053**	**64,167**	**64,581**	**66,939**	**67,060**	**55,667**	**16.8%**	**1.30%**	**0.60%**
Sarles, ND	2,061	867	884	945	789	861	1,183	1,564	1,862	1,962	0 6%	4 17%	-0 55%
Sherwood, ND	3,863	3,223	1,912	3,620	4,138	2,281	3,206	3,055	1,659	1,001	0 3%	-5 33%	-13 93%
St. John, ND	1,087	734	985	888	711	1,043	1,863	1,638	1,875	2,468	0 7%	14 59%	14 59%
Walhalla, ND	17,256	8,535	14,019	14,941	9,605	7,874	9,132	9,721	12,924	11,519	3 5%	1 23%	1 23%
Westhope, ND	6,807	4,823	5,287	5,883	6,277	5,072	6,127	6,591	6,433	5,996	1 8%	-0 17%	-0 17%

Source: US Customs and Border Protection

Figure 3-7: Montana and North Dakota Ports of Entry, Maps and Hours of Operation



- **Roosville** 24 hours a day 7 days a week
- **Piegan** 7 00 AM-11 00 PM (Mountain) 7 days a week
- **Del Bonita** 8 00 AM-9 00 PM (Mountain) 7 days a week from 06/01/2004 to 09/15/2004, 9 00 AM-6.00 PM 7 days a week from 09/16/2003 to 05/31/2004
- **Sweet Grass** 24 hours a day 7 days a week
- **Whitlash** 9 00 AM-5 00 PM (Mountain) 7 days a week
- **Wild Horse** 8 00 AM-9 00 PM (Mountain) 7 days a week from 05/15/2004 to 09/30/2004 8 00 AM-5.00 PM 7 days a week from 10/01/2003 to 05/14/2004
- **Turner** 9 00 AM-6 00 PM (Mountain) 7 days a week from 09/16/2003 to 05/31/2004, 8 00 AM-9 00 PM, 7 days a week from 06/01/2004 to 09/15/2004
- **Morgan** 9 00 AM-6 00 PM (Mountain) 7 days a week from 09/16/2003 to 05/31/2004, 8 00 AM-9 00 PM 7 days a week from 06/01/2004 to 09/15/2004
- **Opheim** 9 00 AM-6 00 PM (Mountain) 7 days a week from 09/16/2003 to 05/31/2004, 8 00 AM-9 00 PM 7 days a week from 06/01/2004 to 09/15/2004
- **Scobey** 8 00 AM-9 00 PM (Mountain) 7 days a week from 06/01/2004 to 09/15/2004, 8 00 AM-6 00 PM 7 days a week from 09/16/2003 to 05/31/2004
- **Whitetail** 9 00 AM-6 00 PM (Mountain) 7 days a week from 09/16/2003 to 05/31/2004, 8 00 AM-9 00 PM 7 days a week from 06/01/2004 to 09/15/2004
- **Raymond** 24 hours a day 7 days a week

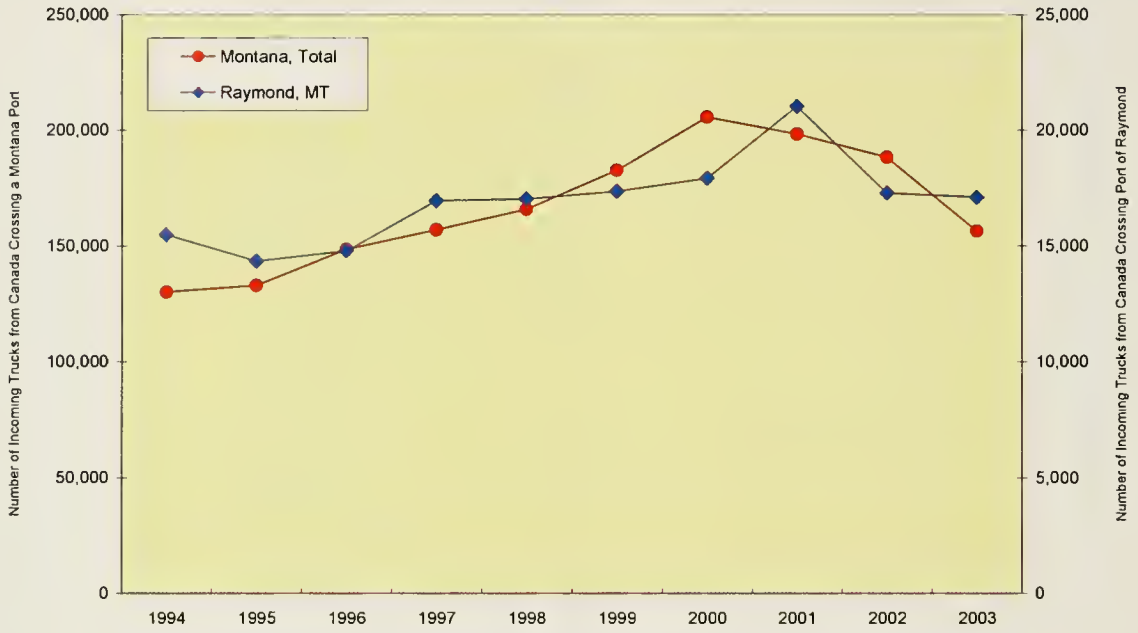


- **Ambrose** 9 00 AM-10 00 PM (Central) 7 days a week
- **Fortuna** 9 00 AM-10 00 PM (Central) 7 days a week
- **Noonan** 9 00 AM-10 00 PM (Central) 7 days a week
- **Portal** 24 hours a day 7 days a week
- **Northgate** 9 00 AM-10 00 PM (Central) 7 days a week
- **Sherwood** 9 00 AM-10 00 PM (Central) 7 days a week
- **Antler** 8 00 AM-9 00 PM (Central) 7 days a week
- **Westhope** 8 00 AM-9 00 PM (Central) 7 days a week
- **Carbury** 9 00 AM-10 00 PM (Central) 7 days a week
- **Dunsteith** 24 hours a day 7 days a week
- **Saint John** 8 00 AM-9 00 PM (Central) 7 days a week
- **Hansboro** 8 00 AM-9 00 PM (Central) 7 days a week
- **Sarles** 9 00 AM-10 00 PM (Central) 7 days a week
- **Hannah** 9.00 AM-10 00 PM (Central) 7 days a week
- **Maida** 9 00 AM-10 00 PM (Central) 7 days a week
- **Walhala** 8 00 AM-10 00 PM (Central) 7 days a week
- **Neche** 8 00 AM-10 00 PM (Central) 7 days a week
- **Pembina** 24 hours a day 7 days a week

Source: U.S. Customs and Border Protection, http://www.customs.gov/xp/cgov/toolbox/ports

Figure 3 - 8 shows that the trend in the number of trucks from Canada entering the U.S. at Port of Raymond closely followed the trend in the number of trucks using any Montana port in the 1994-2003 period. When looking at the mean growth rates in Table 3 - 8, it can be seen that Scobey, Whitetail, and Opheim, all three of which are small ports in the study area, have shown substantial growth when compared to other ports in the state. Use of these minor ports grew to a peak in 2001, and although inbound truck counts declined in the following years, their growth is still substantial.

Figure 3-8: Annual Number of Trucks from Canada Crossing Port of Raymond and all Montana Ports



Source: US Customs and Border Protection

As can be seen from Table 3 - 8, the number of trucks entering both Montana and North Dakota from Canada declined in 2002 and again in 2003. Since the decline affects both states it is most likely due to universal impediments, such as exchange rate fluctuations and the security changes put in place after September 11, 2001. One of the changes that could explain this decrease is the additional impediment to shipping from Canadian origins and destinations via U.S. highways (called "transit shipping"). Before the new security policies were enacted, it was more common for Canadian trucks to pass through the US in transit. This was because Canadian truckers minimize cost and distance by using U.S. routes, due in part to the quality of the roadways. However, with heightened port security, this practice has been made more costly and time consuming. Canadian shippers report that increased paperwork and advance submissions required for crossing each port of entry, in addition to customs checks at each port.

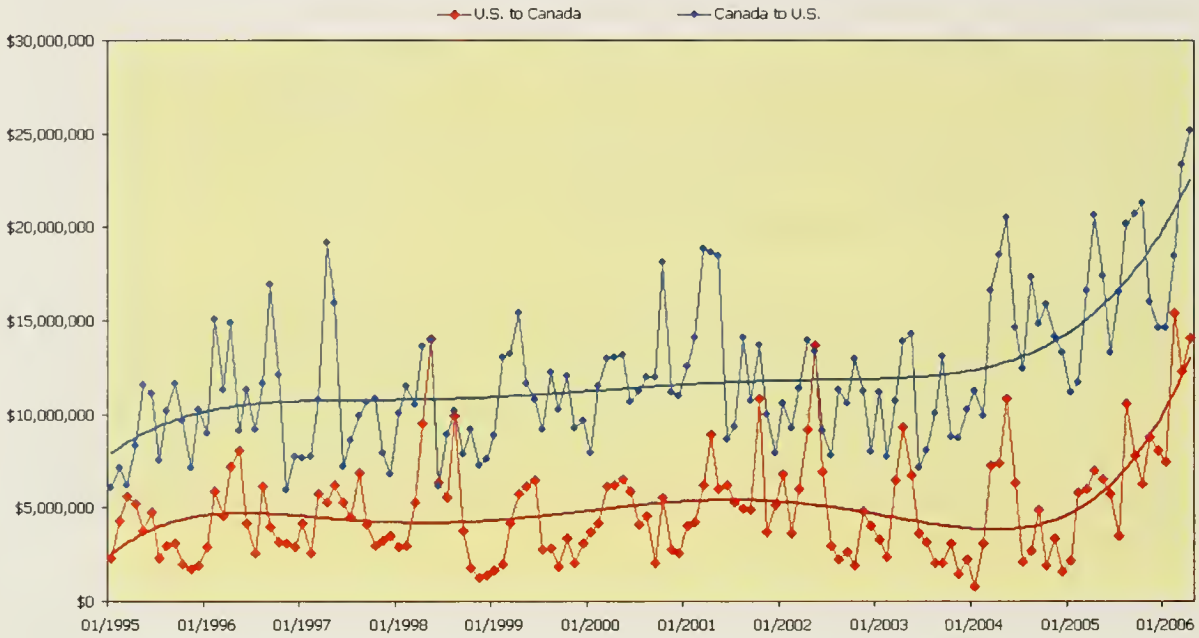
Another measure imposed by heightened security is the advance submission of manifest information requirement on LTL (less than truckload) carriers. These carriers are usually destined to fulfill the just-in-time delivery that many firms are utilizing to lower their warehousing costs. However, the added time commitment needed to prepare and transmit the documentation to US Customs, and the short-term nature of these shipments in general, leads to a significant increase in the generalized cost for these trucking firms, lowering the volume of such trucks coming in from Canada.

Figure 3 – 9 covers a more recent period than the preceding tables, and it shows the value of truck freight passing through customs at Raymond, import and export. In general, there has been an increase over time in the value of shipments passing through this port. In the past 10 years, shipments from Canada to the US passing through the Port of Raymond have been, on average, consistently higher value than those shipments from the US to Canada. The average annual compound growth rates from 1995 to 2006 for the value of shipments from the US to Canada and from Canada to the US passing through the Port of Raymond have been 11 percent and 8 percent, respectively. Also notable is that the value of shipments from the Canada to US (i.e., imports) is higher than the value of shipments from the US to Canada (exports). Interviews suggested this is probably due to the higher number of trucks traveling back empty to Canada, and the number of trucks going north on different routes.

A sharp increase, since 2004, in both import and export values is remarkable in Figure 3 – 9. Values of both imports and exports trucked through customs at Raymond about doubled in the 2004-2006 period. Compared to a similar chart for the Port of Portal, North Dakota (Figure 4 – 1), there is not the same acceleration pattern, and the values of imports at Portal appear fairly flat by comparison. Use of customs facilities at Raymond may have been affected by improvements to the US Customs facilities at this location (completed in 2004) and by recent highway improvements. They also reflect fundamental changes in market conditions driving more north-south shipments through this corridor.

It is currently faster to access the Midwestern U.S. from Saskatchewan through the Port of Portal than through the Port of Raymond. However, in the future, longer wait times at the Port of Portal may divert a share of eastbound traffic to the Port of Raymond.

Figure 3-9: Total Truck Freight Value Passing through Port of Raymond

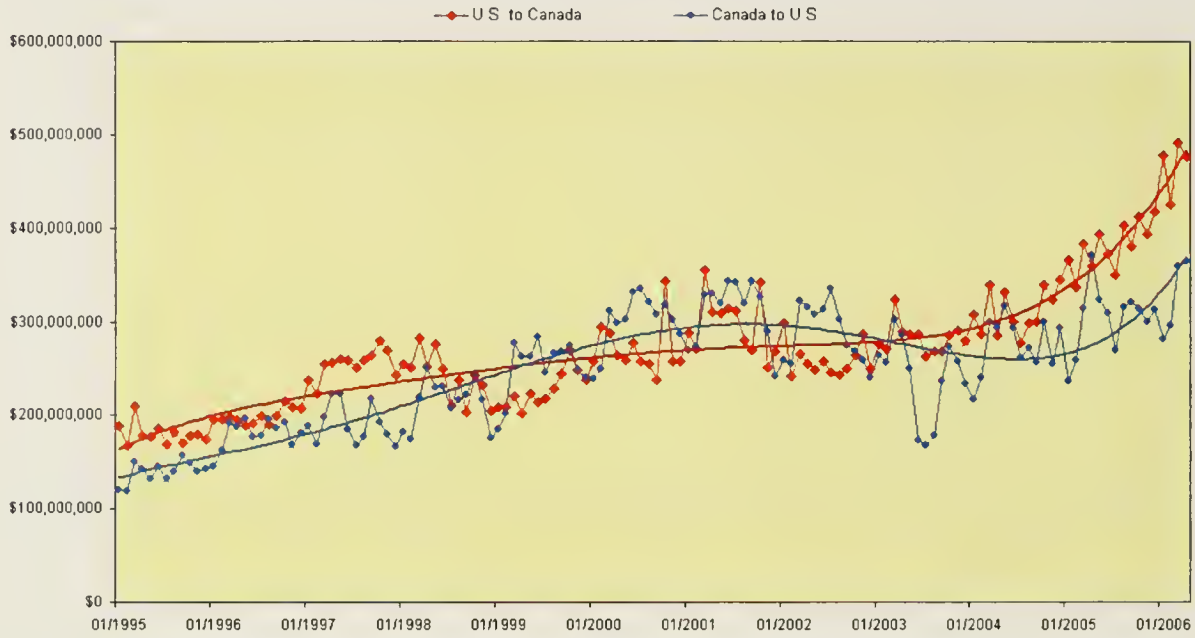


Source: U.S Department of Transportation, Bureau of Transportation Statistics, Transborder Surface Freight Database

Figure 3 - 10 shows the total truck freight value of shipments passing through all Montana ports of entry (POEs). There is an overall positive trend in the total value of freight passing through these ports in the past 10 years. The average annual growth rates between 1995 and 2006 in the value of shipments passing through all Montana ports from the US to Canada and from Canada to the US have been 9 percent and 8 percent, respectively. While the average value of shipments destined for Canada passing through Montana ports is not consistently higher than that of shipments originating in Canada passing through Montana ports of entry, the value of U.S. exports shown here have accelerated more since 2004.

Comparing Figure 3 - 9 and Figure 3 - 10, it is evident that, in the last 10 years, there has been an increase in the total truck freight value passing through the Port of Raymond and through all Montana POEs in general. The acceleration at the Port of Raymond, however, is at a higher intensity than through all Montana POEs. The values of imports have increased faster at Raymond, versus the faster growth in export values for the state as a whole. There has also been an increase in total truck freight value passing through all North Dakota POEs, as can be seen in Figure 4 - 2.

Figure 3-10: Total Truck Freight Value Passing through Montana Ports of Entry (POEs)



Source: U.S Department of Transportation, Bureau of Transportation Statistics, Transborder Surface Freight Database

3.2.3 Shipments by Mode

Table 3 - 9 shows the modal split of shipments originating from and destined to Montana for both the tonnage of shipments as well as the value of shipments.

The table shows that in terms of tonnage of shipments originating in Montana, rail was the most significant mode of transport, accounting for 38.9 percent of total tonnage shipped. However, truck and pipeline transportation also played a substantial role, accounting for 32.2 and 28.4 percent of all shipments, respectively. On the other hand, in terms of the value of shipments, truck was the dominant mode, accounting for 64 percent of value. This was followed by pipeline transportation and rail, which accounted for 25.4 and 6.7 percent of value, respectively. The role of rail was much larger for cross-border and overseas shipments, for which rail accounted for 55.4 and 94.8 percent of tonnage and 26.4 and 73.1 percent of value, respectively.

A larger share of rail in terms of tonnage shipped than value indicates that rail is used predominantly for shipments of bulky commodities with low unit value (i.e.: low value per ton of shipment). Trucks, in turn, are being used for shipments of relatively expensive goods with a high unit value. Pipeline transportation is between the two extreme cases.

For shipments with Montana destinations, truck was the dominant mode of transport. Overall, trucks accounted for 57.4 percent of tonnage and 79.3 percent of value shipped to the state. This was followed by pipeline and rail transportation. It should be noted that pipelines played an important role in cross-border shipments, accounting for nearly 80 percent of all cross-border shipments in terms of tonnage shipped to Montana. However, pipelines played a less significant role in terms of value, accounting for only 10.1 percent of total shipments destined for Montana. Rail accounts for only about 7.7 percent of tonnage and 1.1 percent by value of shipments to the state.

The reduction in inter-modal transportation within the state should also be noted. This has led to the increased dependence on commercial carriers trucking manufactured and retail goods into the state.

Table 3-9: Shipments from and to Montana, by Mode, in Percentage of Total for Geographic Shipment Category

Geographic Category of Shipments	Total Tonnage of Shipments				Total Value of Shipments			
	Rail	Truck	Pipeline	Other	Rail	Truck	Pipeline	Other
Domestic Shipments Originating in Montana	37.3%	32.9%	29.4%	0.4%	6.0%	64.3%	25.8%	3.9%
Cross-border Shipments Originating in Montana	55.6%	35.2%	8.5%	0.7%	26.4%	66.2%	6.5%	0.9%
Overseas Shipments Originating in Montana	94.8%	2.6%	0.0%	2.6%	73.1%	13.3%	0.0%	13.5%
Total Shipments Originating in Montana, by Mode	**38.9%**	**32.2%**	**28.4%**	**0.5%**	**6.7%**	**64.0%**	**25.4%**	**3.9%**
Domestic Shipments with Montana Destination	7.9%	63.3%	28.6%	0.2%	0.8%	81.8%	7.0%	10.3%
Cross-border Shipments with Montana Destination	6.2%	14.3%	79.5%	0.0%	5.7%	31.2%	62.8%	0.3%
Overseas Shipments with Montana Destinations	0.6%	97.9%	0.3%	1.3%	0.1%	95.4%	0.3%	4.2%
Total Shipments with Montana Destinations, by Mode	**7.7%**	**57.4%**	**34.7%**	**0.2%**	**1.1%**	**79.3%**	**10.1%**	**9.5%**

Source: Extracted from 2002 Freight Analysis Framework (FAF) Database for Montana, Federal Highway Administration
** For actual tonnage and value of shipment figures, see Table A-3 in Appendix A*
*** For an alternative breakdown of this data, refer to Table A-4 in Appendix A*

3.2.4 Commodity Structure of Shipments

Domestic Shipments with Montana Origin

Table 3 - 10 shows the top 15 commodities in terms of tonnage shipped from Montana and Table 3 - 11 shows the top 15 commodities in terms of value of commodities shipped from Montana.

Table 3-10: Top 15 Commodities Shipped in Montana by Weight, Domestic Shipments with Montana Origin, Thousands of Short Tons

Commodity	Total	Cumulative Percentage	Shipments by Mode			
			Pipeline &Unknown	Rail	Truck	Other
Coal	55,920.6	42.7%	13,998.5	39,841.3	1,639.3	441.6
Coal, n.e.c.	21,456.3	59.1%	18,715.4	1,070.9	1,670.1	0.1
Cereal grains	10,857.0	67.3%	0.0	1,661.9	9,195.0	0.0
Gasoline	6,032.2	71.9%	1,100.8	499.2	4,432.2	0.0
Crude petroleum	5,189.8	75.9%	4,602.9		586.9	0.0
Logs	4,403.2	79.3%			4,403.2	0.0
Wood prods.	3,892.9	82.2%	16.3	1,359.2	2,489.8	27.6
Nonmetallic minerals	3,846.1	85.2%		2,805.2	993.1	47.8
Fuel oils	2,933.5	87.4%	5.8	34.5	2,893.2	0.0
Gravel	2,485.0	89.3%		0.0	2,485.0	0.0
Waste/scrap	1,997.3	90.8%			1,997.3	0.0
Nonmetal min. prods.	1,970.3	92.3%	0.7	432.7	1,536.0	0.9
Unknown	1,556.5	93.5%	0.0		1,556.5	0.0
Natural sands	1,325.6	94.5%			1,325.6	0.0
Other foodstuffs	918.3	95.2%	4.0	96.6	817.7	0.0
Live animals/fish	905.9	95.9%			905.9	0.0
Mixed freight	696.0	96.5%	0.1		694.6	1.3
Fertilizers	610.6	96.9%	0.0	415.1	195.6	0.0
Other commodities	4,027.1	100.0%	57.9	596.8	3,327.7	44.7
Total	**131,024.3**		**38,502.3**	**48,813.4**	**43,144.6**	**564.0**

Source: Extracted from 2002 Freight Analysis Framework (FAF) Database for Montana, Federal Highway Administration

** For an alternative breakdown of this data, refer to Table A-5 in Appendix A*

Table 3 - 10 shows that the top 6 commodities accounted for almost 80 percent of all shipments in terms of their tonnage, and the top 15 commodities combined accounted for over 96 percent of tonnage. These commodities were natural resources products or products based on natural resources, including coal, grains, gasoline, crude oil, and logs. Some of the top commodities in terms of shipment's weight were also top commodities in terms of value, including coal, gasoline and wood products.

The structure of shipments in terms of value was much more diversified. The top 6 commodities in terms of shipment value accounted for 56.2 percent of all shipments, and the top 15 commodities accounted for less than 80 percent of all shipments.

Table 3-11: Top 15 Commodities Shipped in Montana by Value, Domestic Shipments with Montana Origin, Millions of Dollars

Commodity	Total	Cumulative Percentage	Shipments by Mode			
			Pipeline & Unknown	Rail	Truck	Other
Coal, n.e.c.	$6,250.8	22.9%	$5,783.6	$90.2	$375.7	$1.2
Machinery	$3,152.4	34.4%	$82.2		$2,975.0	$95.2
Gasoline	$1,699.3	40.6%	$341.3	$78.5	$1,279.5	$0.0
Mixed freight	$1,537.6	46.3%	$0.2		$1,510.2	$27.2
Wood prods.	$1,357.9	51.2%	$25.0	$501.5	$811.1	$20.2
Unknown	$1,342.3	56.2%	$0.1		$1,341.7	$0.5
Live animals/fish	$1,059.5	60.0%			$1,059.5	$0.0
Cereal grains	$777.3	62.9%	$2.9	$239.0	$535.3	$0.0
Misc. mfg. prods.	$770.2	65.7%	$3.8		$487.9	$278.5
Fuel oils	$741.0	68.4%	$9.7	$1.8	$729.5	$0.0
Articles-base metal	$676.8	70.9%	$6.1	$1.0	$636.7	$33.0
Other foodstuffs	$585.3	73.0%	$3.3	$41.3	$539.9	$0.9
Motorized vehicles	$548.0	75.0%	$109.8		$401.6	$36.6
Textiles/leather	$545.0	77.0%	$3.0		$413.2	$128.7
Coal	$538.4	79.0%	$122.5	$407.2	$3.8	$4.9
Other commodities	$5,734.1	100.0%	$542.4	$291.5	$4,469.3	$430.9
Total	**$27,315.7**		**$7,035.9**	**$1,652.0**	**$17,569.9**	**$1,057.9**

Source: Extracted from 2002 Freight Analysis Framework (FAF) Database for Montana, Federal Highway Administration

** For an alternative breakdown of this data, refer to Table A-5 in Appendix A*

Domestic Shipments with Montana Destinations

Table 3 - 12 shows the top 15 commodities in terms of tonnage shipped domestically to Montana destinations, and Table 3 - 13 shows top 15 commodities in terms of value shipped domestically to Montana destinations.

Table 3 - 12 shows a similar structure between the top commodities by weight as Table 3 - 10 for commodities shipped domestically originating in Montana. This suggests that a large fraction of these goods (by both weight and value) are shipped from and to destinations in Montana. Some of the top commodities by weight include coal, cereal grains, gasoline, logs, and fuel. Some of the top commodities by value include machinery, mixed freight, miscellaneous manufactured goods, gasoline, and chemical products. The top 15 commodities in terms of weight accounted for almost 90 percent of all shipments, and the top 15 commodities in terms of value accounted for 73 percent of all shipments. As with commodities originating in Montana, we see a somewhat more diversified shipment structure as it would be suggested by the weight of the shipments alone.

Table 3-12: Top 15 Commodities Shipped in Montana by Weight, Domestic Shipments with Montana Destination, Thousands of Short Tons

Commodity	Total	Cumulative Percentage	Shipments by Mode			
			Pipeline &Unknown	Rail	Truck	Other
Coal	19,778.9	28.6%	13,998.5	4,119.0	1,661.4	0.0
Cereal grains	9,241.7	42.0%	73.5	0.0	9,168.2	0.0
Gasoline	5,980.7	50.7%	1,100.8	499.2	4,380.7	0.0
Logs	3,908.4	56.3%			3,908.4	0.0
Coal, n.e.c.	3,856.7	61.9%	2,435.3	1.2	1,420.0	0.1
Fuel oils	3,051.8	66.3%	5.8	34.5	3,011.5	0.0
Crude petroleum	2,531.6	70.0%	1,944.6		586.9	0.0
Gravel	2,490.5	73.6%	0.0	0.0	2,490.5	0.0
Nonmetal min. prods.	2,141.2	76.7%	5.9	266.5	1,867.4	1.3
Waste/scrap	2,023.9	79.6%			2,023.9	0.0
Wood prods.	1,824.6	82.3%	52.2	207.7	1,556.5	8.3
Unknown	1,496.4	84.4%	0.0		1,496.3	0.1
Natural sands	1,382.6	86.4%		43.0	1,339.6	0.0
Mixed freight	1,305.6	88.3%	8.2		1,287.1	10.3
Live animals/fish	901.0	89.6%			901.0	0.0
Other commodities	7,161.6	100.0%	123.8	275.6	6,622.7	139.5
Total	**69,077.3**		**19,748.6**	**5,446.9**	**43,722.2**	**159.6**

Source: Extracted from 2002 Freight Analysis Framework (FAF) Database for Montana, Federal Highway Administration

** For an alternative breakdown of this data, refer to Table A-5 in Appendix A*

Table 3-13: Top 15 Commodities Shipped in Montana by Value, Domestic Shipments with Montana Destination, Millions of Dollars

Commodity	Total	Cumulative Percentage	Shipments by Mode			
			Pipeline &Unknown	Rail	Truck	Other
Machinery	$3,923.2	13.6%	$87.8	$0.0	$3,648.4	$187.0
Mixed freight	$3,281.1	24.9%	$3.9		$3,169.2	$108.1
Misc. mfg. prods.	$1,915.1	31.5%	$159.9	$0.0	$933.4	$821.8
Gasoline	$1,709.5	37.4%	$341.3	$78.5	$1,289.7	$0.0
Unknown	$1,271.5	41.8%	$0.1		$1,270.9	$0.6
Chemical prods.	$1,224.5	46.1%	$32.4	$0.2	$1,061.1	$130.8
Coal, n.e.c.	$1,101.4	49.9%	$753.1	$2.7	$344.5	$1.1
Live animals/fish	$1,045.9	53.5%			$1,045.9	$0.0
Motorized vehicles	$1,030.0	57.1%	$142.8	$45.1	$569.0	$273.1
Pharmaceuticals	$881.1	60.1%	$8.0		$368.4	$504.6
Meat/seafood	$838.5	63.0%	$0.6		$834.6	$3.2
Articles-base metal	$822.4	65.9%	$9.9	$1.0	$706.5	$105.1
Fuel oils	$747.7	68.4%	$9.7	$1.8	$736.2	$0.0
Plastics/rubber	$703.0	70.9%	$12.6	$0.0	$677.4	$13.0
Textiles/leather	$689.8	73.3%	$3.0	$0.1	$551.6	$135.1
Other commodities	$7,733.1	100.0%	$462.4	$110.0	$6,460.1	$700.7
Total	**$28,917.8**		**$2,027.6**	**$239.2**	**$23,666.9**	**$2,984.1**

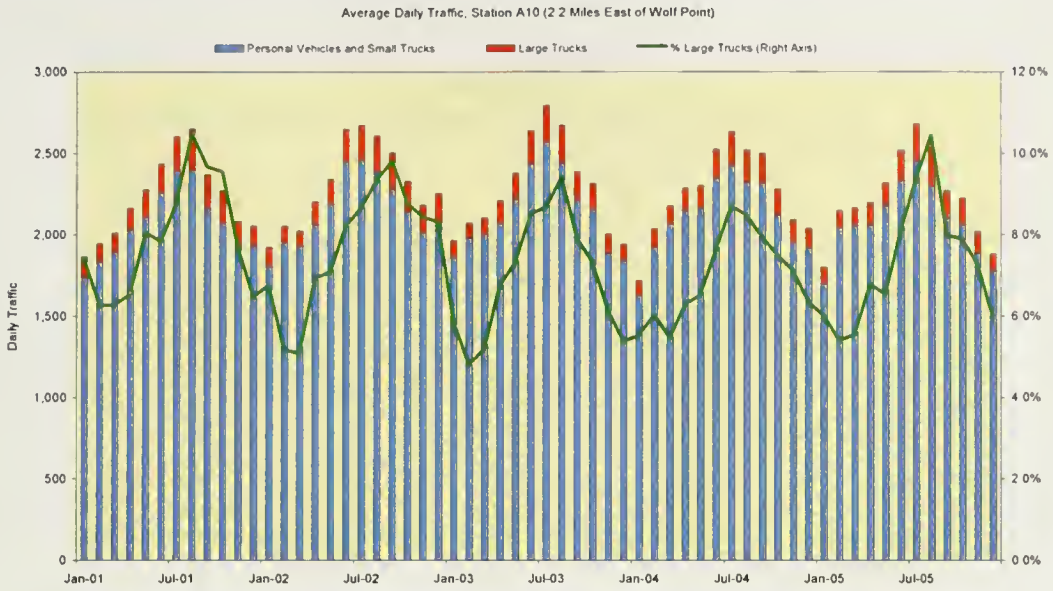
Source: Extracted from 2002 Freight Analysis Framework (FAF) Database for Montana, Federal Highway Administration

** For an alternative breakdown of this data, refer to Table A-5 in Appendix A*

3.3 Commercial Shipments in the Study Area

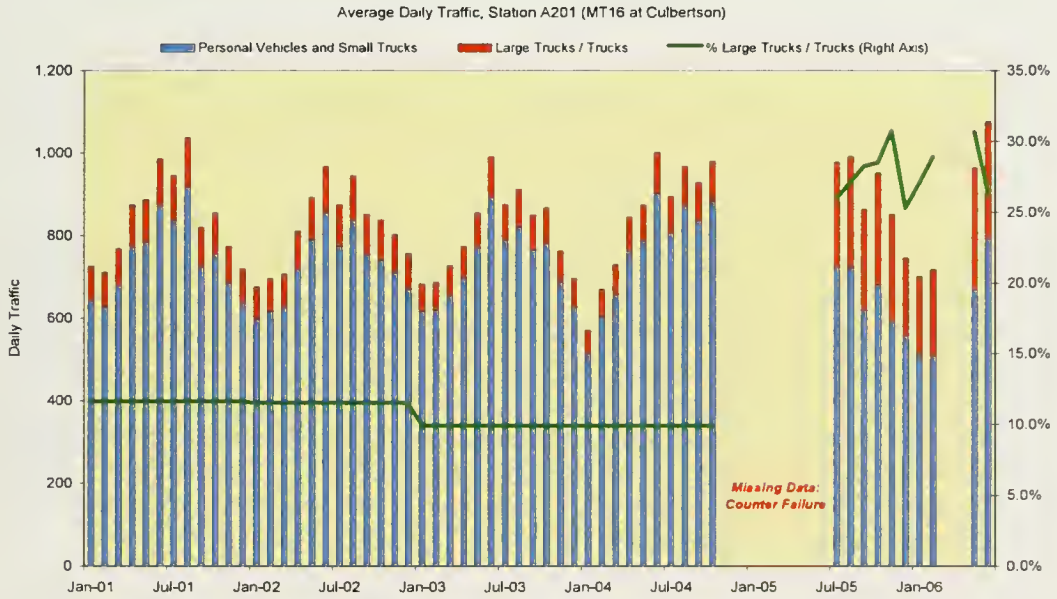
Figure 3 - 11 and Figure 3 - 12 show AADT data at two selected stations: station A-10 (US 2 near Wolf Point) and station A-201 (MT 16 at Culbertson). It can be seen that there has been little to negative growth on the sections of US 2 and MT 16 for which data is available. It is also evident that there are strong seasonality effects, with spikes in AADT levels in June, July, and August. Also, truck traffic does not comprise a large percentage of total AADT traffic on either the sections of US 2 or MT 16 being discussed. Less than 5 percent of total traffic is truck traffic on US 2 near Wolf Point. There is slightly more truck traffic on MT 16 at Culbertson (around 10 percent of total traffic). Figure 3 - 13 shows a map of AADT in the study area.

Figure 3-11: Average Daily Traffic on US 2 Near Wolf Point, Jan. 2001 – Dec. 2005



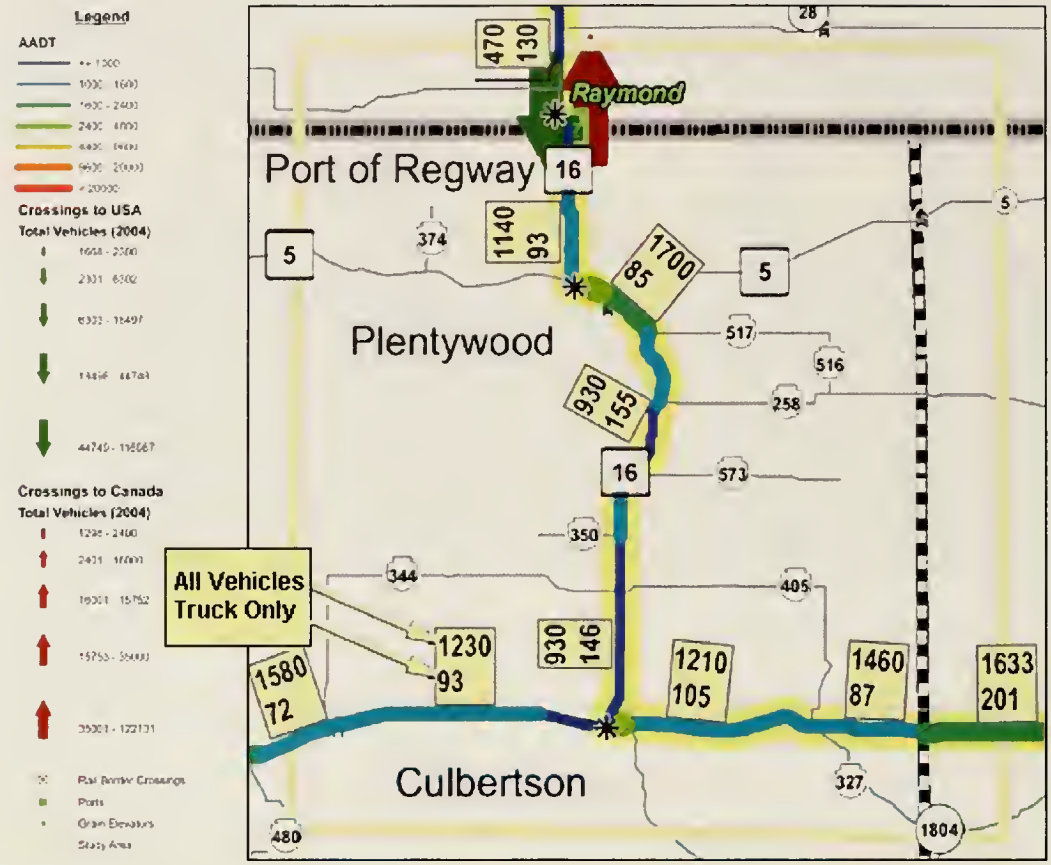
Source: MDT Automatic Traffic Recorders; http://www.mdt.mt.gov/publications/datastats.shtml

Figure 3-12: Average Daily Traffic Counts on MT 16 at Culbertson, Jan. 2001 - June 2006



Source: MDT Automatic Traffic Recorders; http://www.mdt.mt.gov/publications/datastats.shtml
Note: Monthly vehicle distribution (personal vehicles vs. large trucks) not available before 2005. Change in data sources and variable definition (all vs. large trucks) may explain the jump in truck percentage after July 2005. Data after 2005 is for East lane only; multiplied by two to obtain two-way AADT comparable to pre-2005 data.

Figure 3-13: Map of Average Annual Daily Traffic in Study Area



Source: 2003 Automatic Traffic Recorders

3.4 Individual Traffic Generation

The study area is a largely rural area with small cities having a population of less than 5,000 (see Table 2 - 2). Table 2 - 1 and Table 2 - 2 also show that populations in the entire six-county study area and most of its major cities are declining. This suggests that, for now, local population is not very likely to be a significant factor leading to a substantial increase in traffic.

In the medium to long term, population in the study area is projected to increase at a small to moderate rate compared to the entire state. Specifically, as Table 3 - 14 indicates, population between now and 2025 in the six-county study area is projected to grow at 0.3 percent per year compared to 1 percent per year in all of Montana.

The strongest growth is expected in Richland and Roosevelt Counties, 0.6 percent per year on average, or about 13 percent over the period from 2004 to 2025. Therefore, over the next twenty years, a moderate increase in traffic in the study corridor could be expected from increasing population.

Table 3-14: Population Projections for Montana and the 6-County Study Area

County	2004	2010	2020	2025	Average Annual Rate of Growth 2004-2025	Total Change 2004-2025
Montana	926,865	988,874	1,090,686	1,148,162	1.0%	23.9%
6-County Study Area	**34,281**	**34,681**	**35,518**	**36,586**	**0.3%**	**6.7%**
Daniels	1,844	1,890	1,877	1,910	0.2%	3.6%
McCone	1,775	1,780	1,767	1,771	0.0%	-0.2%
Richland	9,112	9,561	9,966	10,362	0.6%	13.7%
Roosevelt	10,660	10,920	11,553	11,992	0.6%	12.5%
Sheridan	3,620	3,680	3,635	3,750	0.2%	3.6%
Valley	7,270	6,850	6,720	6,801	-0.3%	-6.5%

Source: Montana Department of Commerce

3.5 Effect of Transportation System on Tourism

The quality and level of service capabilities of a transportation network are essential components for the prosperity and growth of a tourism industry within any region. Within remote regions, this dependence upon transportation infrastructure is intensified. Given the remoteness of the study area's region from major population centers within the United States, it should come as no surprise that tourism industry stakeholders within the area have identified the transportation system as a primary facilitator of growth for their industry. Through numerous interviews of tourism stakeholders within the region, it was expressed that the existing two-lane transportation system contains inherent limitations that negatively affect the regional tourism industry.[17]

Respondents stated that out-of-area travelers know what to expect from a four-lane highway, whereas a two-lane road is wrought with uncertainties which contribute to a hesitancy to visit more areas far from a four-lane highway. The perception of the expected travel experience was also cited as an impediment to more extensive travel within the region, because of the belief that four-lane highways create a comfort level for travelers beyond satisfying capacity. It should be noted that these issues may be less related to absolute road capacity than to the perception of road quality and the level of service improvements provided by a four-lane corridor.

[17] Survey interviews were conducted by the research team from June – July 2006.

3.6 Transportation and Competitiveness of Industries in the Study Area

3.6.1 Supply of Transportation Services

The total shoulder widths (the sum of the left and right shoulders) along the corridor, as seen in Figure 3 – 14, are six to ten feet. These widths do not appear sufficient to allow a semi-truck to safely pull to the side of the road.

As can be seen from Figure 3 - 15, the study area corridor currently consists of a road network of two lanes. The implications for industries that are currently located in or are contemplating locating within the region are important. Many of the economic development stakeholders surveyed in the region report that the area has lost potential businesses seeking to relocate to the region because there is no nearby four-lane highway.

For a business analyzing possible relocation to a remote area, a sufficient transportation system is many times a major concern and many firms consider the minimum level of transportation network to consist of a four-lane highway. The reasoning is that firms located far from final markets are dependent on a transportation network to receive the inputs and deliver their products to markets and many firms therefore value locations with close-by access to a four-lane highway.

For industries that are already located within the area, some of the survey respondents stated that the lack of a four-lane system inhibits their businesses in some ways. Several respondents stated that the current road conditions are not up to an acceptable level of quality, thus increasing the wear and tear on their transport vehicles. Others stated that having a two-lane system makes moving trucks along this route more dangerous and can possibly create a bottleneck due to the difficulty in passing vehicles.

A four-lane system along the corridor would also be important for regional connectivity reasons. The area shares many similarities with adjacent states and provinces that extend beyond political borders. The broader region is largely comprised of comparable agriculture-based economy, experiencing energy sector expansions, and sharing similar historical and cultural heritage. A MDT survey of regional transportation agencies[18] also found that some neighboring states are progressing towards four-lane expansions of their portions of the TRE corridor. System continuity is critical for four main perspectives:

- Strategic: Four-lane continuity ensures that the true interconnectivity of national corridors linking markets from Mexico through key states like Texas and Colorado all the way to Canada. Given the great capacity at the Port of Raymond and the growth of the region, the four-lane continuity will strategically position the corridor as a freight corridor and as NAFTA corridor that handles the long term growth.

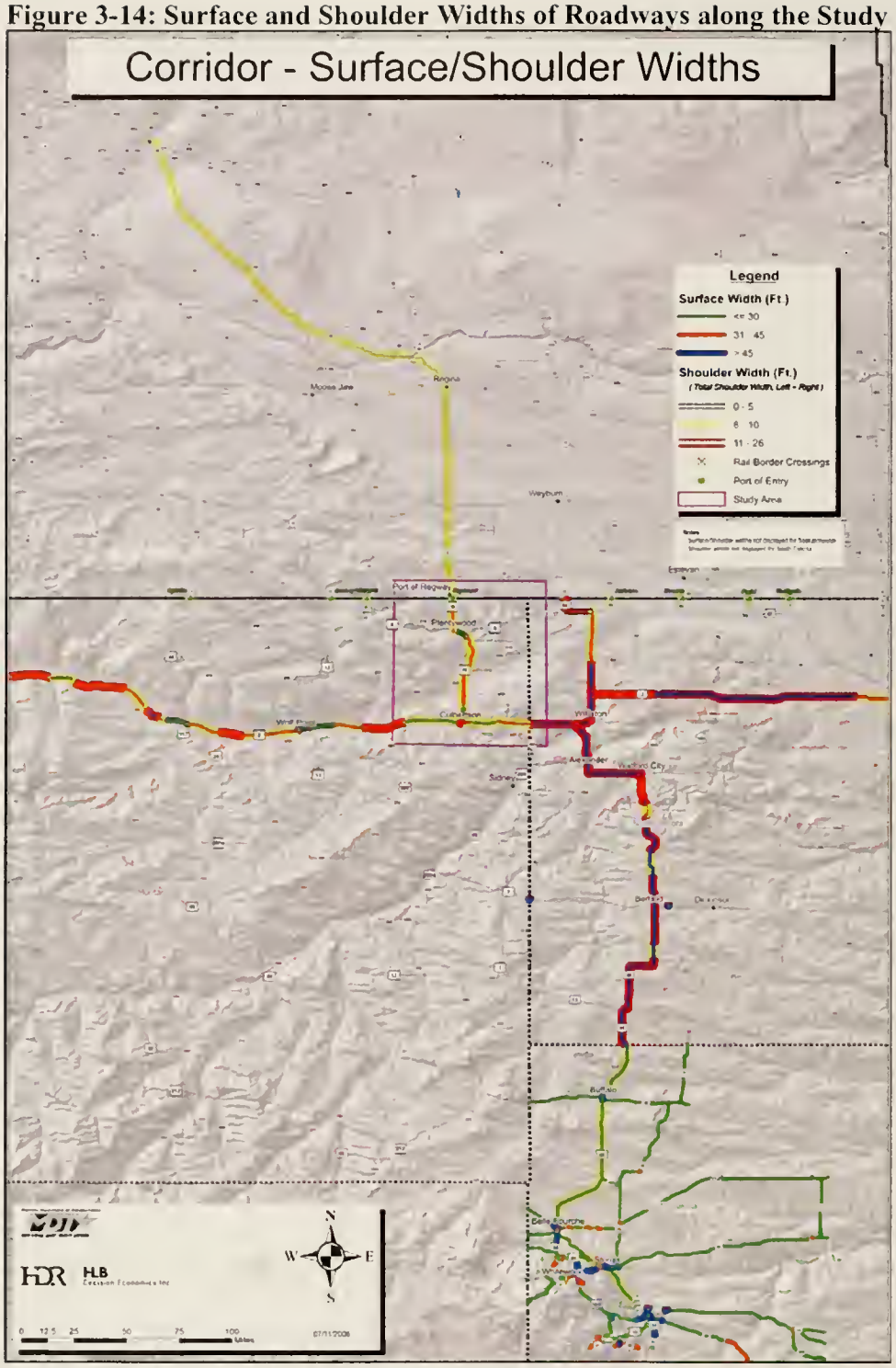
[18] See section 5.1.4 in Working Paper #2: Assessment of Existing and Future Opportunities.

- Competitiveness: Four-lane continuity positions the corridor as a true alternative, and therefore a competitor, to interstate roadways in the region. The competitiveness of the corridor will be reflected in induced traffic demand and eventually increasing economic development. The competitiveness can be both as a north-south segment and as a link between the east and west regions.

- User Perception: Four-lane continuity would play a significant role in drivers' perception. Research in road pricing showed that driver's choice for roadway is based more on the perceived level of service rather than the actual level of service. Accordingly, through our stakeholders interviews, we found that they perceived the existing roadway is less safe than the data shows and that they think that a four-lane roadway would provide safer travel and a good level of service for both personal vehicles and truck traffic. It is this perception that would also lead truck dispatchers as well as logistics and supply chains managers to make this corridor as the segment of choice for their long-haul trucks in the region.

- Design Consistency: Four-lane continuity will also ensure design consistency and therefore a synergistic effect on traffic and freight growth along the corridor.

Figure 3-14: Surface and Shoulder Widths of Roadways along the Study Corridor



** Surface/shoulder widths not available for Saskatchewan; shoulder widths not available for South Dakota*

Figure 3-15: Number of Lanes on Roadways in the Study Area

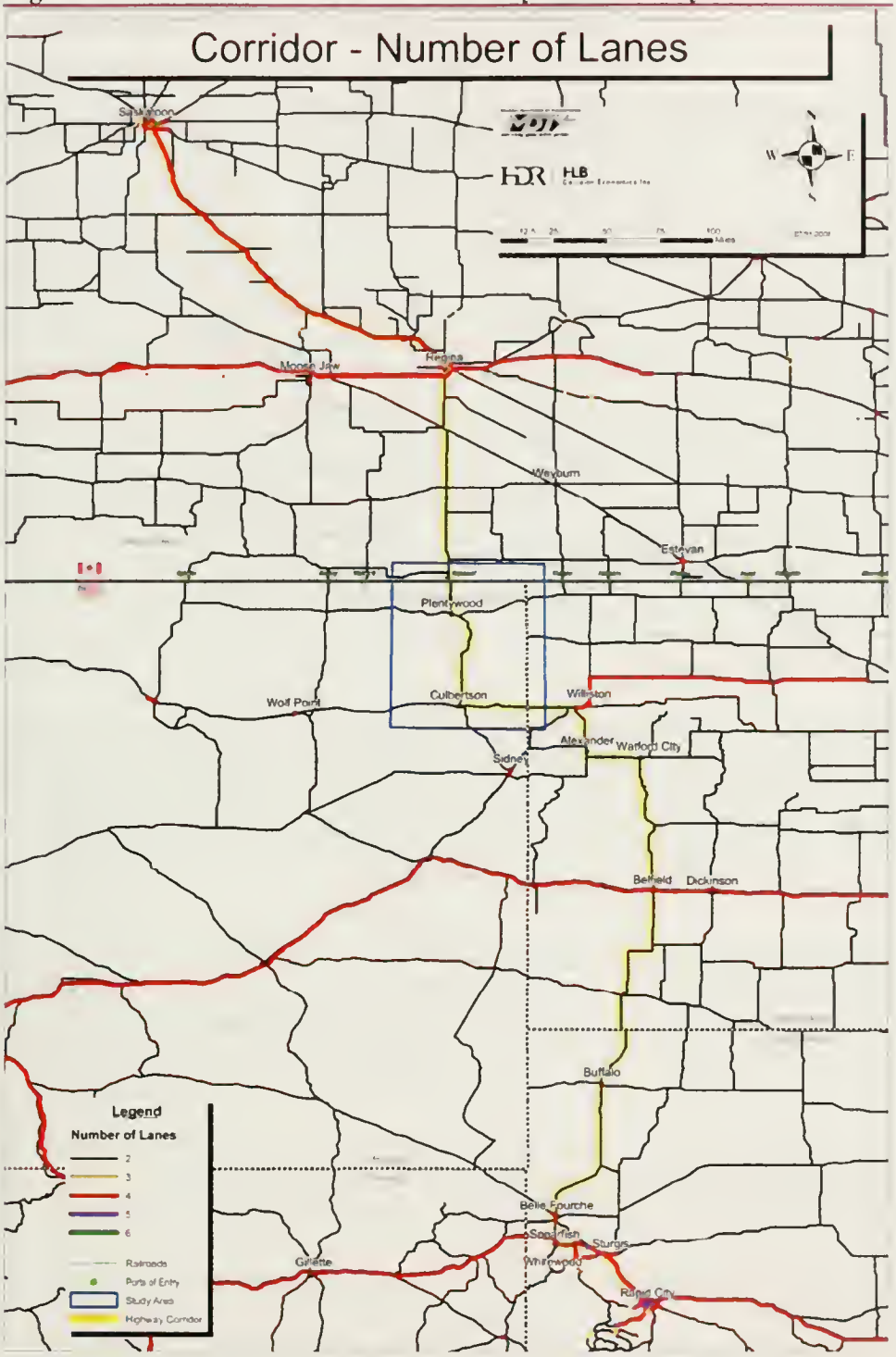
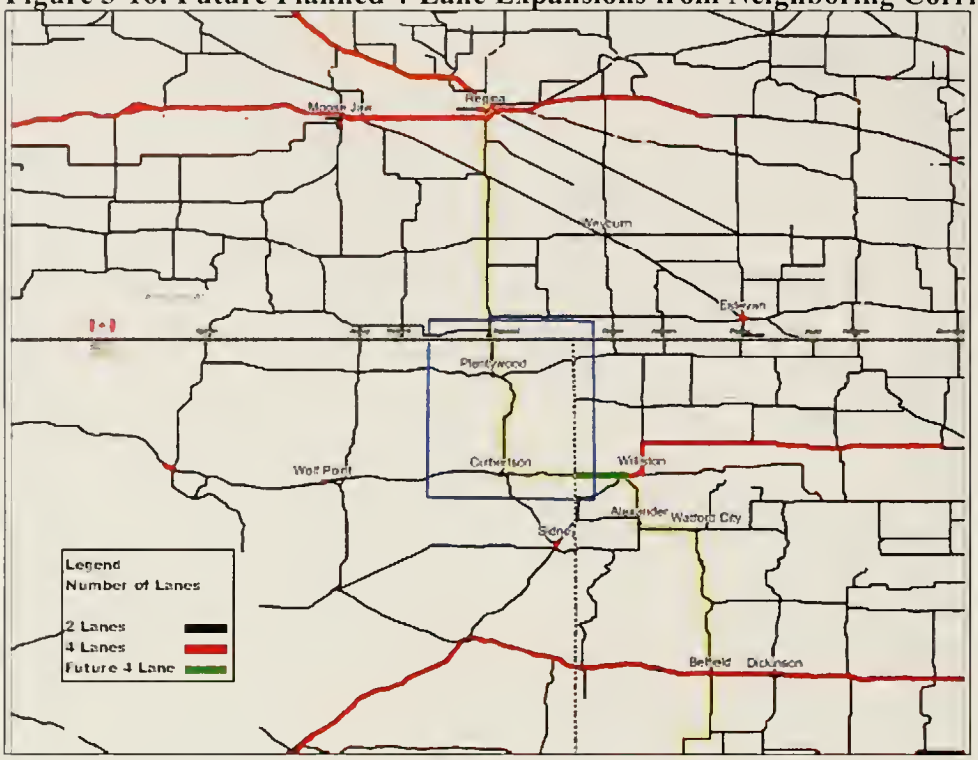


Figure 3-16: Future Planned 4-Lane Expansions from Neighboring Corridor States



3.6.2 Industrial Demand for Transportation

Crude Petroleum Industry

The analysis and data presented in Section 2 indicate that the oil industry has been growing rapidly in the study area in the last two years. The rise in world crude oil prices in the last few years has likely contributed significantly to this growth.

The oil industry requires roadway transportation to move inputs such as labor, equipment, and supplies, as well as large quantities of output to refineries and distribution centers. The analysis of the data on transportation mode for various commodities shows that crude petroleum is typically transported by pipelines, and only a fraction is transported by truck (see Table 3 - 10). Analysis and interviews with industry reported in a related study indicates that Montana oil companies consider the transportation system as currently serving their needs well.[19]

Bureau of Transportation Statistics information suggests that the Port of Raymond is the nation's eighth largest port, by value, in merchandise (i.e., oil) trade borders by pipeline.[20] Some reports suggest that the pipeline infrastructure in the area is inadequate. Currently, pipelines in the region are filled to capacity. Without more pipeline capacity, it is not possible to transport all of the oil being produced in the region to domestic refineries except by (more costly) trucking. Trucking oil to refineries significantly cuts producer's profits and dampens investment in the area.[21]

Highway transportation is important for the oil industry primarily for movement of supplies, equipment and workers. A large proportion of supply transportation and personal travel to work occurs on local roads in remote areas. Conditions of these roads may impact access to labor markets (i.e.: whether a company with extraction fields in remote areas will be able to attract a suitable labor force) as well as reliability and timeliness of supplies.

Agriculture

Agriculture in Montana relies on truck transportation. Table 3 - 10 shows that in terms of weight, 85 percent of cereal grains are transported by truck during some part of shipment. Note that even products which will ultimately be transported via rail often need to first be trucked to a loading facility. In terms of shipment value, the share of trucks transporting cereal grains is somewhat lower at 68 percent (see Table 3 - 11).

A low overall share of rail for transportation of a bulky commodity such as grains suggests that rail is relatively more expensive, or not easily accessible. In fact, some farmers in Montana are reported to ship their crops by truck to distant rail terminals to obtain better shipping rates. The

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[19] See *Montana Highway Reconfiguration Study*, report for Montana Department of Transportation, prepared by Cambridge Systematics with Economic Development Research Group, ICF Consulting, and Short Elliot Hendrikson, May 2005, page 3-27.

[20] U.S. Department of Transportation. Bureau of Transportation Statistics. Transborder Surface Freight Data (Washington, DC 1998).
http://www.bts.gov/publications/north_american_transportation_in_figures/html/table_6_3c.html

[21] See *Governors to Discuss Need for Better Oil Infrastructure*, The Associated Press, April 2006.

recent trend toward consolidating grain elevators on the BNSF main line also may have contributed to increased shipments by truck.[22]

Another factor contributing to a high use of truck transportation may be production of certain specialized high-value crop varieties, such as organic grains, seed and pulse crops, or Montana wheat varieties. These higher value crops are typically shipped by truck.[23]

Thus, as agricultural production continues to increase, there will likely be increased demand for truck transportation services. Transportation improvements would certainly support business expansion (including production of higher-value crops) by improving market access and helping attract and encourage value-added processing.[24]

3.7 Safety Issues

Safety concerns attributed to transportation systems manifest themselves in several ways. Some respondents to the survey believe that the mixture of auto and truck traffic creates an inherently unsafe and frustrating driving experience on two-lane roads that would be addressed by a four-lane facility. Others believe that the inability of vehicles to pass others conveniently along a two-lane roadway, and disparities in vehicle speeds by type, contribute to an overall unsafe environment along the corridor.

Speed limits in Montana are shown in Table 3 - 15.

Table 3-15: Speed Limits for Montana, in miles per hour

Type of Highway	Cars and Light Trucks		Heavy Trucks (over one ton manufacturer's rated capacity)	
	Daytime	Nighttime	Daytime	Nighttime
Interstate	75	75	65	65
Interstate Within Urban Area Billings, Great Falls and Missoula	65	65	65	65
Two-Lane	70	65	60	55
U.S. 93	65	65	60	55

Source: Montana Department of Transportation

Table 3 - 16 shows the crash and injury counts and rates for the state and the 6-county study area in 2004. The study area has lower crash and injury rates than the state as a whole.

[22] See *US 2, Havre to Belknap EIS. Existing Economic Conditions Report*, ICF Consulting, PLH-TCSP 1-6(44)384, Control Number 4951, June 2003, page 35.
[23] See *US 2, Havre to Belknap EIS. Existing Economic Conditions Report*, ICF Consulting, PLH-TCSP 1-6(44)384, Control Number 4951, June 2003, page 38
[24] See *Montana Highway Reconfiguration Study*, report for Montana Department of Transportation, prepared by Cambridge Systematics with Economic Development Research Group, ICF Consulting, and Short Elliot Hendrikson, May 2005, page 3-33.

Table 3-16: Crash and Injury Counts and Rates for Montana and the Six-County Study Area, 2004

	Six-County Study Area*	Montana	Six-County Study Area as Percentage of Montana
Crashes	508	21,776	2.3%
Crash Rate**	1.20	1.95	-
Injuries	261	9,261	2.8%
Injury Rate**	0.62	0.83	-

Source: Montana Department of Transportation, Traffic Safety Problem Identification, FY 2006
** Includes all public roadways in the 6 counties*
*** Crash and injury rates are based upon a calculated expose factor (i.e.: the crash rate is the total number of crashes divided by the exposure factor). This expose factor is calculated based on vehicle miles and population. The rates are reported per 100 million vehicle miles traveled.*

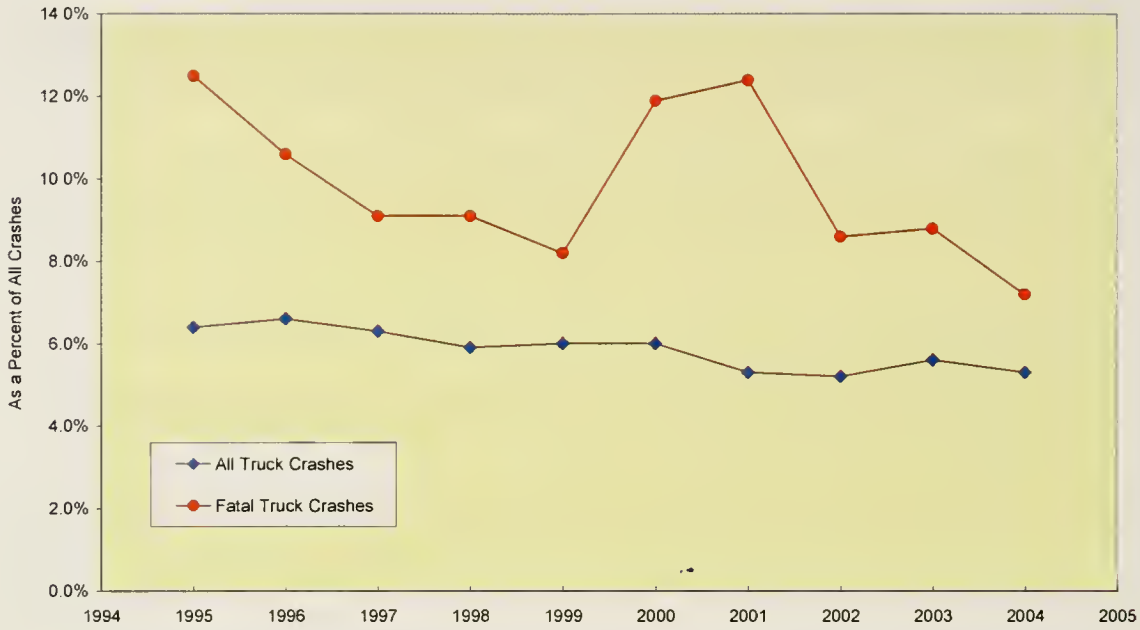
Table 3 - 17 shows the number of crashes involving trucks at the state level. The number of truck crashes has declined by almost 30 percent since 1996. Figure 3 - 17 and Table 3 - 17 both show crashes and fatal crashes involving trucks as a percentage of total crashes and fatal crashes. They illustrate that the incidence of a crash causing a fatality is higher when a truck is involved in the accident.

Table 3-17: Number of Crashes Involving Trucks in Montana

Year	Crashes		Fatal Crashes	
	Number	Percent of all Crashes	Number	Percent of all Fatal Crashes
1995	1,314	6.4%	27	12.5%
1996	1,646	6.6%	21	10.6%
1997	1,426	6.3%	24	9.1%
1998	1,310	5.9%	19	9.1%
1999	1,262	6.0%	16	8.2%
2000	1,346	6.0%	24	11.9%
2001	1,159	5.3%	25	12.4%
2002	1,228	5.2%	20	8.6%
2003	1,288	5.6%	21	8.8%
2004	1,163	5.3%	15	7.2%

Source: Montana Department of Transportation, Traffic Safety Problem Identification, FY 2006

Figure 3-17: Truck Crashes as a Percentage of All Crashes in Montana



Because of the importance of agriculture in the study area, economic growth and change will likely bring increased truck traffic, which can be expected to reduce the overall safety of the corridor. Oversized loads (see Figure 3 - 18), often required for moving agricultural equipment and products, also reduce safety.

Figure 3-18: Truck Carrying Oversized Load Traveling along US 2

3.8 Constraints and Regulations Affecting Transportation

The vehicle type used for cross-border trucking is largely determined by State Gross Vehicle Weight (SGVW) regulations. Among the western Border States, Montana has the highest GVW limit, at 131,060 pounds for the majority of the state (between Shelby, Montana and the Montana-Alberta border at the Port of Sweet Grass, the limit is higher at 137,500 pounds). In North Dakota, South Dakota, and Minnesota, the GVW limits are 105,500 pounds, 129,000 pounds and 80,000 pounds, respectively. Manitoba, Canada's weight limit is only slightly more strict than that for the majority of Montana, at 124,300 pounds.

The weight limits in the western Border States are generally 20,000 pounds on single axles and 34,000 pounds on tandem axles. These weight limits tend to be more restrictive than those in Canada. Also more restrictive than the requirements in Canada are the load distribution requirements (number of axles and axle spacing) for the western Border States. Bridge Formula B (BFB)[25] is used to calculate western border crossing load distribution requirements.

However, Canada's steering axle limit (5,500 kg) is lower than that in the western Border States (6,000 kg). This requires truckers to move their fifth wheel when traveling into Canada in order to meet regulations. Also, the split tandems used for semi trailers in the western Border States are not allowed in western Canada. Finally, the western Border States (except for Minnesota) currently allow 14-foot high vehicles, whereas most western Canadian provinces have somewhat more restrictive truck height limits. Saskatchewan, for instance, permits 4.15 meter (13.65 feet) heights.

The majority of trucks used for shipments in the western Border States (75 percent in Montana) are small trucks of four axles or less. Due to the wide variation of truck size and weight regulations, trucks in the western US and Canada crossing international and State borders are required to stretch or contract trucks; have axles raised, lowered, or repositioned; have fifth wheels repositioned; have tires added or removed; and have loads shifted/modified.

Numerous respondents surveyed within the transportation sector expressed their desire to obtain a harmonization of the different bridge length rules in the western states and western Canadian provinces. It was their belief that this would save much time and therefore lower the overall cost of transport within regions that contain standardized restrictions.

3.8.1 Federal Highway Regulations

Federal size and weight regulations are enforced on all routes included on the National Network. In Montana, only Interstate Highways are on the National Network. On the other hand, both North and South Dakota have some non-Interstate routes that are on the National Network (including US 2 and US 85), which means these routes are constrained by Federal Highway regulations. Thus, Montana has the flexibility to change truck standards on MT 16 and US 2, while North Dakota and South Dakota do not have this flexibility on similar routes. The fact that

[25] A formula to determine the maximum allowable weight of a vehicle given the number of axels and axle spacing (see http://www.fhwa.dot.gov/)

Montana is not constrained by these regulations could lead to regulatory changes that increase truck flows through Montana if the traffic's destination states also adopted the standardized regulations. This would require a broad move toward a regional harmonization of highway regulations amongst Saskatchewan, Wyoming, Colorado, and Montana.[26]

[26] See *Estimating Traffic Changes and Pavement Impacts from Freight Truck Diversion Following Changes in Interstate Truck Weight Limits*, Humphreys and Fortowsky, January 2006, p. 75

4: EXISTING CONDITIONS IN NEIGHBORING REGIONS

This section provides an overview of existing conditions in regions neighboring the study area so as to gain a firmer understanding of the study area's economic potential. The study area is bordered on the east by North Dakota and South Dakota and on the north by the province of Saskatchewan, in Canada.

4.1 North Dakota

4.1.1 Population and Employment

Table 4 - 1 shows the population of the two most northwestern counties in North Dakota, Williams and Divide. Williston, in Williams County, is one of the 10 largest cities in North Dakota, with a population of 12,512. This only accounts for less than 2 percent of the state's total population. Williston is the largest North Dakota city in close proximity to the study area.

Table 4 - 1 also shows employment numbers for the two counties and their major cities. In North Dakota, a little over 50 percent of the population is part of the labor force. Williams County has a higher rate of labor force participation than Divide County does. Of the cities listed in the table, Williston has the highest rate of labor force participation.

Table 4-1: Population in Williams and Divide Counties and Their Major Cities, 2000

		Williams County				Divide County			North Dakota
		Total County	Williston City	Tioga City	Ray City	Total County	Crosby City	Noonan City	
Total Population	Number	19,761	12,512	1,125	534	2,283	1,089	154	642,200
	% of State	3.08%	1.95%	0.18%	0.08%	0.36%	0.17%	0.02%	---
Employment	Number	10,191	6,673	520	236	1,029	493	62	338,982
	% in Labor Force	51.57%	53.33%	46.22%	44.19%	45.07%	45.27%	40.26%	67.50%

Source: U.S. Census Bureau, 2000 Census

4.1.2 Industry Structure

Table 4 - 2 shows the employment structure of Williston, North Dakota, and the five counties closest to the six-county region on the Montana side of the border. The table shows that the largest industry in terms of employment is the education, health care and social services sector, accounting for over 23 percent of total employment. The second largest industry is retail trade, with a little over 16 percent of total employment concentrated in this sector.

The similarities in industrial structure between this area and the six-county study area are made plain by comparing this table with Table 2 – 8. Generally, the North Dakota counties are somewhat less dependent on agriculture, and somewhat better represented in retail trade and the

professional services industries. This is almost certainly due to the city of Williston and its function as a trade center for the region including northeast Montana.

Table 4-2: Employment by Industry in Percent of Total Employment, 2000

Industry	Williston, North Dakota	Five County Area	Location Quotient	United States
Agriculture, forestry, fishing and hunting, and mining	8.5%	16.6%	8.74	1.9%
Construction	5.9%	5.7%	0.84	6.8%
Manufacturing	3.7%	3.2%	0.23	14.1%
Wholesale trade	4.4%	3.1%	0.86	3.6%
Retail trade	16.1%	12.5%	1.07	11.7%
Transportation and warehousing, and utilities	4%	5.3%	1.02	5.2%
Information	1.6%	1.8%	0.58	3.1%
Finance, insurance, real estate, and rental and leasing	6.2%	5.1%	0.74	6.9%
Professional, scientific, management, administrative, and waste management services	7.6%	5.3%	0.57	9.3%
Educational, health and social services	23.1%	22.6%	1.14	19.9%
Arts, entertainment, recreation, accommodation and food services	8.2%	7.9%	1.00	7.9%
Other services (except public administration)	5.4%	5.2%	1.06	4.9%
Public administration	5.3%	5.7%	1.19	4.8%

Source: U.S. Census Bureau, 2000 Census

Notes: Location Quotients shown here are the percentage of industry to total employment in 5-counties in northwest North Dakota region divided by the percentage for the U.S. Quotients greater than 1.00 indicate a greater concentration of the activity in the area than the U.S. Five Counties include: Burke, Divide, McKensie, Mountrail, and Williams.

4.1.3 Traffic and Freight Movements

Table 4 - 3 shows the length of the road network in North Dakota. The vast majority of roads in North Dakota are rural roads. Urban roads account for just 2.3 percent of all lane-miles of roads, much less than the national average of 26.4 percent.

Though there was a slight increase in lane-miles of both urban and rural roads in North Dakota over the period from 2000 to 2004, the total lane-miles of both rural and urban roads in North Dakota remained virtually unchanged.

Table 4-3: Lane Miles of Roads in North Dakota

Lane-Miles of Roads, 2000			Lane-Miles of Roads, 2004			Rate of Growth 2000-2004	Percent Urban in Total, 2004
Rural	Urban	Total	Rural	Urban	Total		
171,338	4,010	175,348	171,630	4,061	175,691	0.2%	2.3%

Source: Highway Statistics, 2000 and 2004 issues

Table 4 - 4 shows highway traffic characteristics for North Dakota. The table indicates that over the period from 2000 to 2004, highway travel, as measured by annual vehicle miles of travel, increased by 4.5 percent on rural roads and 7.3 percent on urban roads. In 2004, the share of trucks in traffic on rural roads in North Dakota amounted to 18.6 percent, and the share of trucks on urban roads amounted to 6.4 percent.

The rate of growth in traffic is much higher in North Dakota than in the nation. However, it should also be noted that traffic levels in North Dakota are substantially below the national average.

Table 4-4: Highway Traffic Characteristics in North Dakota and the Nation

Measure of Travel	North Dakota			United States		
	2000	2004	2000-2004 Growth	2000	2004	2000-2004 Growth
Annual Vehicle-Miles of Travel (Millions) - Rural	5372	5614	4.50%	1,084,961	1,070,248	-1.4%
Percent Trucks	15	18.6	24.00%	14.8%	15.6%	4.9%
Annual Vehicle-Miles of Travel (Millions) - Urban	1845	1980	7.32%	1,664,842	1,892,265	12.0%
Percent Trucks	4.3	6.4	48.84%	7.0%	7.7%	9.7%
Annual Vehicle-Miles of Travel (Millions) - Total	7217	7594	5.22%	2,749,803	2,962,513	7.2%
AADT per Lane (State-Agency Owned Road System), Total Urban and Rural*	135	150	11.11%	2,693	2,833	4.9%

Source: Highway Statistics, 2000 and 2004 issues

In North Dakota, the effort to expand US 2 from Minot to Williston to 4 lanes has been initiated. The project has been segmented into 10 smaller projects, and the completion date is set for 2008. The reconstruction is for almost 98 miles of US 2 between the two cities. Community leaders expect that the expansion of this section of US 2 will bring new economic opportunities to the northwest corridor of North Dakota, especially by attracting new business.

Table 4 - 5 shows the top 15 commodities in terms of tonnage shipped to North Dakota;
Table 4 - 6 shows the top 15 commodities in terms of value.

Table 4-5: Top 15 Commodities Shipped to North Dakota by Weight, Domestic Shipments with North Dakota Destination, Thousands of Short Tons

Commodity	Total	Cumulative Percentage	Shipments by Mode			
			Pipeline &Unknown	Rail	Truck	Other
Coal	39,361.3	30.0%	33,082.8	1,116.9	5,161.6	0.0
Cereal grains	36,120.4	57.47%		116.8	36,003.6	0.0
Coal, n.e.c.	20,143.2	72.80%	18,234.7	74.1	1,834.2	0.2
Gravel	5,157.7	76.73%	0.0	148.8	5,008.9	0.0
Waste/scrap	4,989.5	80.53%		117.3	4,872.2	0.0
Crude petroleum	4,867.4	84.23%	4,855.1		12.2	0.0
Nonmetal min. prods.*	4,170.1	87.41%	20.8	628.4	3,515.9	5.1
Other ag prods.	4,056.3	90.50%	2.6	129.6	3,924.1	0.0
Gasoline	3,656.8	93.28%	27.3		3,629.5	0.0
Fuel oils	2,100.7	94.88%	10.4		2,090.4	0.0
Other foodstuffs	1,854.5	96.29%	27.7	510.5	1,308.0	8.2
Fertilizers	1,774.7	97.64%		1,477.4	297.3	0.0
Unknown	1,293.3	98.63%	8.0		1,285.3	0.0
Natural sands	943.0	99.35%	8.3	177.6	757.1	0.0
Wood prods.	859.0	100.00%	11.3	126.1	719.9	1.8
Total	**131,347.9**		**56,288.9**	**4,623.5**	**70,420.1**	**15.3**

Source: Extracted from 2002 Freight Analysis Framework (FAF) Database for North Dakota, Federal Highway Administration

Table 4 - 5 shows that the top 6 commodities by weight shipped to North Dakota were coal, cereal grains, coal n.e.c. (not elsewhere classified), gravel, waste/scrap, and crude petroleum. Some of the top commodities in terms of shipment's weight were also top commodities in terms of value, including coal n.e.c. and cereal grains (see Table 4 - 6).

Table 4-6: Top 15 Commodities Shipped to North Dakota by Value, Domestic Shipments with North Dakota Destination, Millions of Dollars

Commodity	Total	Cumulative Percentage	Shipments by Mode			
			Pipeline &Unknown	Rail	Truck	Other
Coal, n.e.c.	$5,940.9	29.58%	$5,606.5	$1.7	$332.5	**$0.3**
Machinery	$3,360.3	46.31%	$197.1	$51.2	$2,945.6	**$166.3**
Cereal grains	$2,210.2	57.32%		$27.2	$2,182.9	**$0.0**
Mixed freight	$1,268.9	63.64%	$22.2		$1,179.9	**$66.8**
Unknown	$1,113.5	69.18%	$3.7		$1,109.6	**$0.2**
Other ag prods.	$1,058.2	74.45%	$15.2	$15.1	$1,027.5	**$0.4**
Gasoline	$750.3	78.19%	$4.5		$745.8	**$0.0**
Other foodstuffs	$690.3	81.63%	$28.9	$80.1	$580.3	**$0.9**
Nonmetal min. prods.*	$672.5	84.97%	$30.0	$362.7	$271.7	**$8.1**
Articles-base metal	$570.5	87.81%	$22.7	$0.8	$518.9	**$28.2**
Textiles/leather	$550.6	90.56%	$62.7	$0.2	$466.9	**$20.8**
Pharmaceuticals	$541.7	93.25%	$13.6		$251.1	**$276.9**
Crude petroleum	$486.8	95.68%	$485.5		$1.2	**$0.0**
Live animals/fish	$435.7	97.85%			$435.7	**$0.0**
Wood prods.	$432.4	100.00%	$28.0	$35.2	$365.9	**$3.4**
Total	**$20,082.6**		**$6,520.5**	**$574.2**	**$12,415.7**	**$572.2**

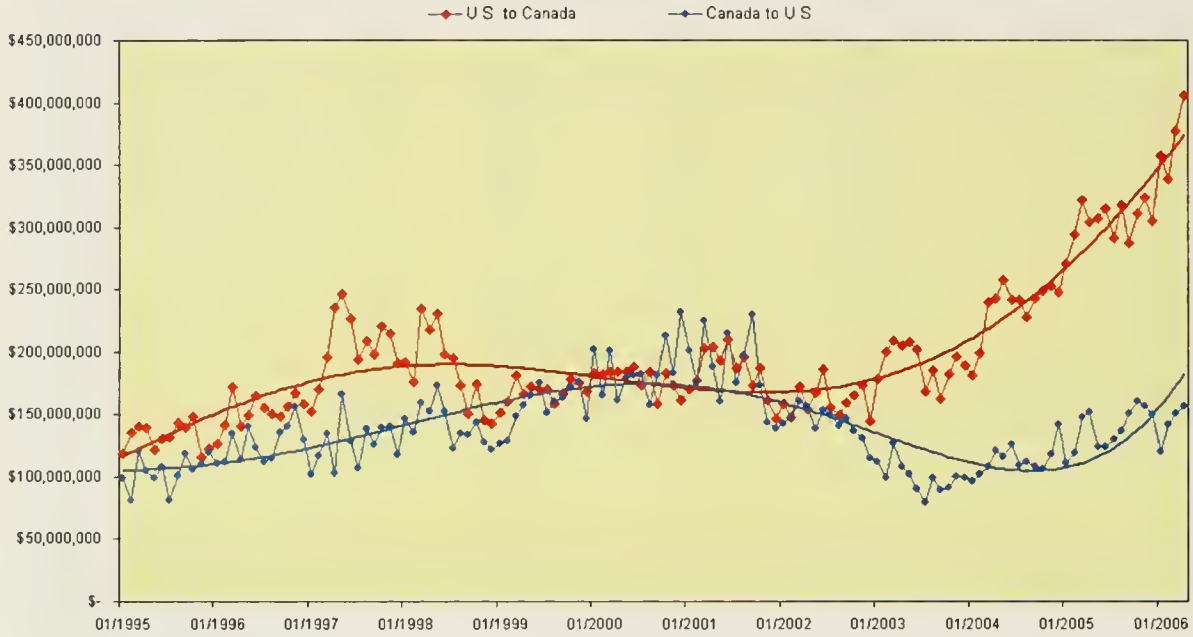
Source: Extracted from 2002 Freight Analysis Framework (FAF) Database for North Dakota, Federal Highway Administration

4.1.3.1 Shipments Crossing the US-Canadian Border

Figure 4 - 1 shows the total truck freight value passing through the Port of Portal. In the past 10 years, the value of shipments from the US to Canada passing through the Port of Portal has been, in general, higher than the value of shipments from Canada to the US passing through this port. This difference in value has grown substantially since 2003. Since 2003, in fact, there has been a rather significant increase in the total truck freight value of shipments passing through the Port of Portal from the US to Canada. Similar growth is not seen in shipments originating in Canada and destined for the US passing through the Port of Portal. The average annual compound growth rate from 1995 to 2006 for the value of shipments from the US to Canada and from Canada to the US passing through the Port of Portal has been 11% and 2%, respectively.[27] (Compare to Figure 3 – 9. The port at Raymond has seen faster growth in both import export and values, and faster growth of import than export values.)

[27] For an overview of the final destination of the freight passing through the Canadian border, see Figure A-2 in Appendix A.

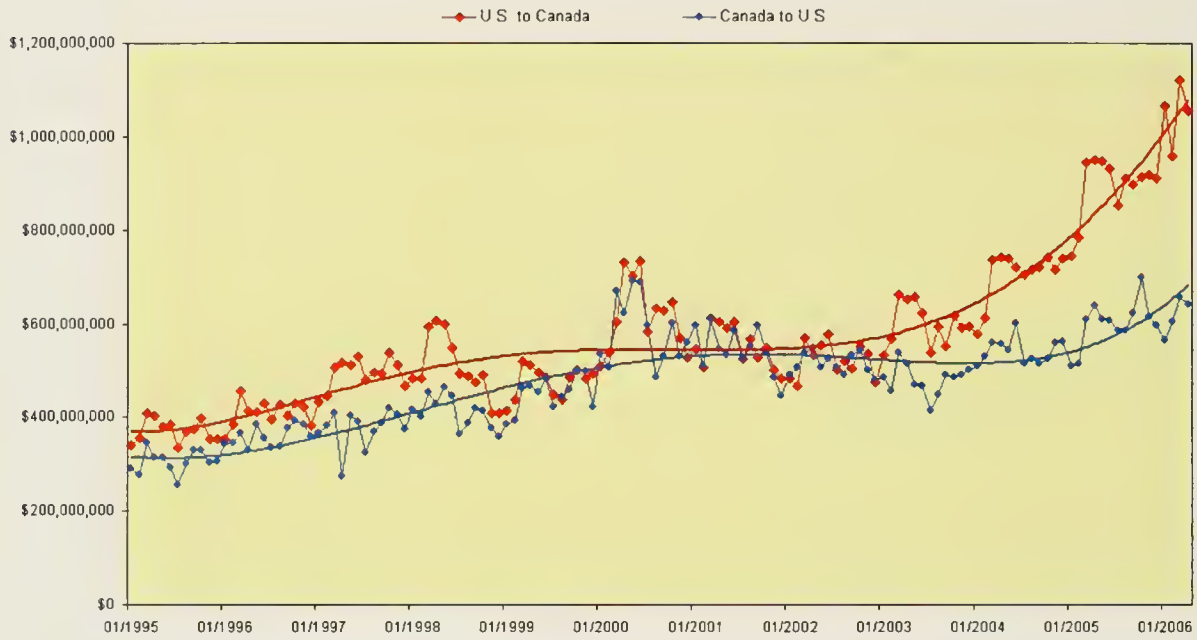
Figure 4-1: Total Truck Freight Value Passing through Port of Portal



Source: U.S Department of Transportation, Bureau of Transportation Statistics, Transborder Surface Freight Database

Figure 4 - 2 shows the total truck freight value of shipments passing through all North Dakota ports of entry. There is an overall positive trend in the total value of freight passing through these ports over the past 10 years. The average annual growth rates between 1995 and 2006 in the value of shipments passing through all North Dakota ports from the US to Canada and from Canada to the US have been 11% and 6%, respectively. In general, over the past 10 years, the value of shipments destined for Canada passing through North Dakota ports are higher than those originating in Canada passing through North Dakota ports of entry. The difference in values between shipments originating in the US passing through North Dakota ports and those originating in Canada passing through North Dakota ports becomes increasingly significant from 2003 to 2006.

Figure 4-2: Total Truck Freight Value Passing through North Dakota Ports of Entry



Source: U.S Department of Transportation, Bureau of Transportation Statistics, Transborder Surface Freight Database

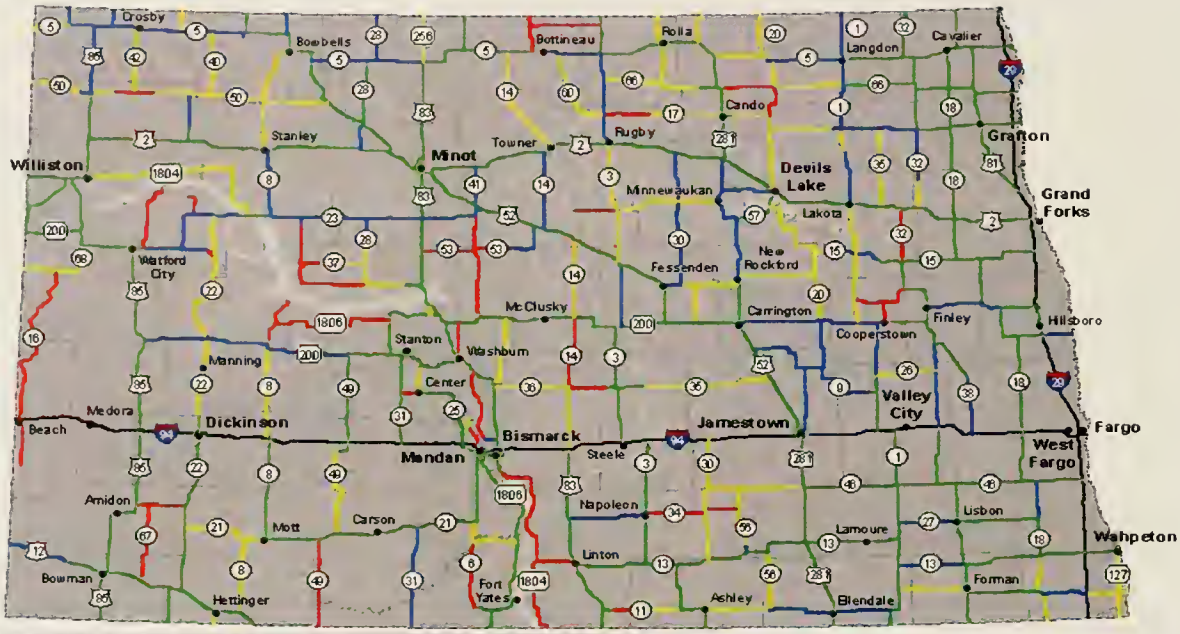
4.1.3.2 North Dakota Sections of the Theodore Roosevelt Expressway

The sections of US 2 and US 85 in North Dakota along the Teddy Roosevelt Expressway (TRE) are almost exclusively two-lane roadways (except for a short segment west of Williston which has been expanded to four-lanes). However, the North Dakota Department of Transportation has indicated they do plan on extending the four-lane section of US 2 to the Montana border.[28] The speed limits are 65 miles per hour for both daytime and night time traffic.

The weight restriction along the US 2 and US 85 sections of the TRE can be seen in Figure 4 - 3.

[28] Information comes from MDT surveys of transportation agencies in other states and provinces within the broader region. (See Section 5.1.4 of Working Paper #2: Assessment of Existing and Future Opportunities)

Figure 4-3: North Dakota Load Restrictions

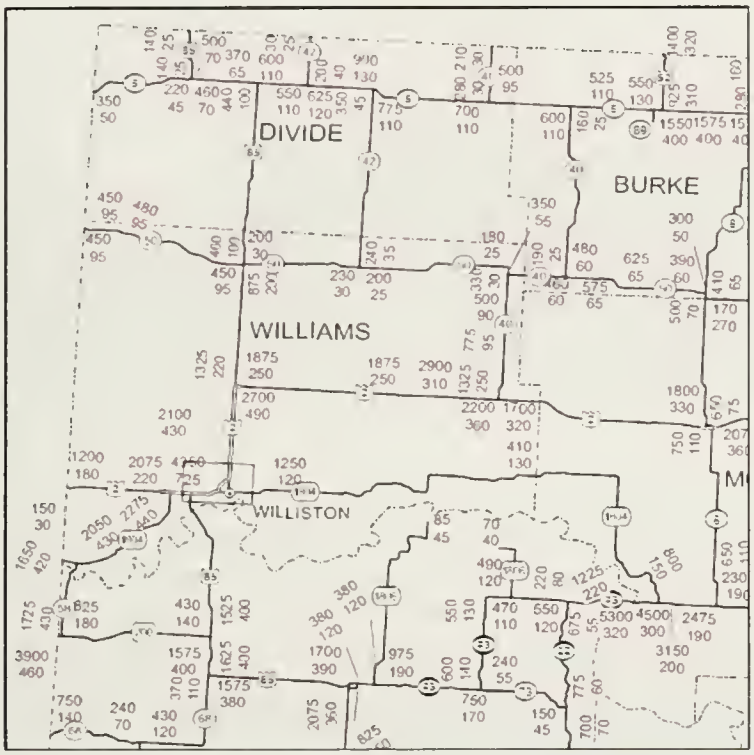


Restrictions in Effect	by Legal Weight	8 - Ton	7 - Ton	6 - Ton
Interstate System				
Single Axle	20,000 lbs	16,000 lbs	14,000 lbs	12,000 lbs
Tandem Axle	34,000 lbs	32,000 lbs	28,000 lbs	24,000 lbs
3 Axle Group or more per Axle	17,000 lbs	14,000 lbs	12,000 lbs	10,000 lbs
Max. Axle Group	48,000 lbs	42,000 lbs	36,000 lbs	30,000 lbs
Gross Weight	105,500 lbs	105,500 lbs	105,500 lbs	80,000 lbs

Source: North Dakota Department of Transportation, http://www.dot.nd.gov/roadreport/loadlimit/loadlimit.asp

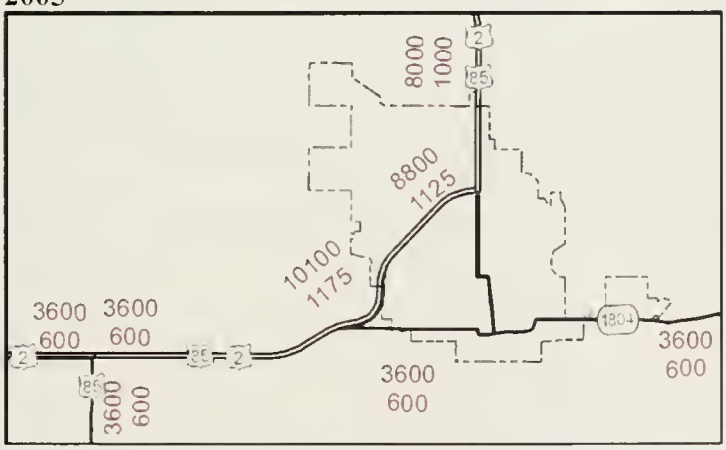
Figure 4 - 4 and Figure 4 - 5 show AADT counts and commercial truck traffic for the US 2 and US 85 sections of the TRE.

Figure 4-4: Northwestern North Dakota Average Daily Traffic and Commercial Truck Traffic, 2005



Source: North Dakota Department of Transportation, http://www.dot.nd.gov/road-map/pdf/traffic/trafficstate_2005.pdf

Figure 4-5: Williston Average Annual Daily Traffic and Commercial Truck Traffic, 2005



Source: North Dakota Department of Transportation, http://www.dot.nd.gov/road-map/pdf/traffic/trafficstate_2005.pdf

4.2 South Dakota

4.2.1 Population and Employment

Table 4 - 7 shows total population in South Dakota. In 2004, total population was estimated at 741,480. This is a decrease of 1.8 percent since the 2000 Census. Table 4 - 7 also shows employment numbers for the state. In South Dakota, nearly 70 percent of the population is part of the labor force.

Table 4-7: Population and Employment in South Dakota, 2000

		North Dakota		
		2000	2004	2000-2004 Growth
Total Population		754,844	741,480	-1.77%
Employment	Number	394,945	408,125	3.34%
	% In Labor Force	68.4%	70.9%	

Source: U.S. Census Bureau, 2000 Census and 2004 Estimates

4.2.2 Industry Structure

Table 4 - 8 shows the employment structure of South Dakota. The table shows that the largest industry in terms of employment is the education, health care and social services sector, accounting for about 22 percent of total employment. The second largest industry is retail trade, with 12 percent of total employment concentrated in this sector.

Table 4-8: Employment by Industry in Percent of Total Employment, 2000

Industry	South Dakota
Agriculture, forestry, fishing and hunting, and mining	8.1%
Construction	6.3%
Manufacturing	11.1%
Wholesale trade	3.3%
Retail trade	12%
Transportation and warehousing, and utilities	4.7%
Information	2.1%
Finance, insurance, real estate, and rental and leasing	7.4%
Professional, scientific, management, administrative, and waste management services	5%
Educational, health and social services	22%
Arts, entertainment, recreation, accommodation and food services	8.3%
Other services (except public administration)	5.1%
Public administration	4.8%

Source: U.S. Census Bureau, 2000 Census

4.2.3 Traffic and Freight Movements

Table 4 - 9 shows the length of the road network in South Dakota. The vast majority of roads in South Dakota are rural roads. Urban roads account for just 3.2 percent of all lane-miles of roads, much less than the national average of 26.4 percent.

There was a slight increase in lane-miles of total roads in South Dakota over the period from 2000 to 2004. This was due to the nearly 22 percent increase in total lane-miles of urban roads in the State between 2000 and 2004.

Table 4-9: Lane Miles of Roads in South Dakota

Lane-Miles of Roads, 2000			Lane-Miles of Roads, 2004			Rate of Growth 2000-2004	Percent Urban in Total, 2004
Rural	Urban	Total	Rural	Urban	Total		
164,640	4,421	169,061	164,052	5,391	169,443	0.23%	3.18%

Source: Highway Statistics, 2000 and 2004 issues

Table 4 - 10 shows highway traffic characteristics for South Dakota. The rate of growth in traffic is higher in South Dakota than in the nation, but traffic levels in South Dakota are substantially below the national average.

Table 4-10: Highway Traffic Characteristics in South Dakota and the Nation

Measure of Travel	South Dakota			United States		
	2000	2004	2000-2004 Growth	2000	2004	2000-2004 Growth
Annual Vehicle-Miles of Travel (Millions) - Rural	6,519	6,597	1.2%	1,084,961	1,070,248	-1.4%
Annual Vehicle-Miles of Travel (Millions) - Urban	1,913	2,187	14.3%	1,664,842	1,892,265	12.0%
Annual Vehicle-Miles of Travel (Millions) - Total	8,432	8,784	4.2%	2,749,803	2,962,513	7.2%

Source: Highway Statistics, 2000 and 2004 issues

Figure 4 - 6 shows the average annual daily traffic for the South Dakota portion of US 85 north of Rapid City.

Figure 4-6: Northwestern South Dakota Average Annual Daily Traffic, 2005

Source: South Dakota Department of Transportation
** AADT counts – upper value is for all vehicles; lower value is for trucks only.*

Table 4 - 11 shows the top 15 commodities in terms of tonnage shipped to South Dakota, while Table 4 - 12 shows the top commodities in terms of value.

Table 4-11: Top 15 Commodities Shipped to South Dakota by Weight, Domestic Shipments with South Dakota Destination, Thousands of Short Tons

Commodity	Total	Cumulative Percentage	Shipments by Mode			
			Pipeline &Unknown	Rail	Truck	Other
Cereal grains	26,168.4	32.10%			26,168.4	
Coal, n.e.c.	19,916.4	56.53%	19,184.8	122.1	606.4	3.2
Gravel	8,943.7	67.50%	2,354.4	378.5	6,210.8	0.0
Nonmetal min. prods.*	6,027.3	74.89%	292.8	472.2	5,217.0	45.3
Other ag prods.	2,876.8	78.42%	89.7		2,786.0	0.0
Natural sands	2,784.2	81.84%	29.2		2,755.0	
Gasoline	1,987.3	84.27%	4.7		1,982.6	
Coal	1,939.6	86.65%		1,471.1	468.5	
Live animals/fish	1,829.8	88.90%			1,829.8	
Fertilizers	1,685.3	90.97%	18.5	84.9	1,581.9	
Articles-base metal	1,530.8	92.84%	8.8	1.5	1,512.2	8.4
Wood prods.	1,476.4	94.65%	0.6	48.7	1,424.7	2.5
Waste/scrap	1,472.8	96.46%		37.1	1,435.7	
Unknown	1,463.4	98.26%	0.9		1,462.6	0.0
Fuel oils	1,422.1	100.00%	1.3	56.6	1,364.2	
Total	**81,524.3**		**21,985.7**	**2,672.7**	**56,805.7**	**59.4**

Source: Extracted from 2002 Freight Analysis Framework (FAF) Database for South Dakota, Federal Highway Administration

Table 4 - 11 shows that the top 6 commodities by weight shipped to South Dakota were cereal grains, coal n.e.c., gravel, non-metal mineral products, other agricultural products, and natural sands. Some of the top commodities in terms of shipment's weight were also top commodities in terms of value, including coal n.e.c. and cereal grains (see Table 4 - 12).

Table 4-12: Top 15 Commodities Shipped to South Dakota by Value, Domestic Shipments with South Dakota Destination, Millions of Dollars

Commodity	Total	Cumulative Percentage	Shipments by Mode			
			Pipeline &Unknown	Rail	Truck	Other
Coal, n.e.c.	$6062.0	21.37%	$5,923.7	$8.1	$127.9	$2.3
Machinery	$4241.6	36.32%	$93.7		$3,886.5	$234.4
Mixed freight	$2615.2	45.53%	$44.4		$2,398.0	$172.8
Articles-base metal	$2345.7	53.80%	$46.9	$1.1	$2,171.8	$123.4
Live animals/fish	$2175.9	61.47%			$2,175.9	
Cereal grains	$1487.5	66.71%			$1,487.5	
Motorized vehicles***	$1342.3	71.44%	$86.3	$38.0	$1,082.1	$101.8
Electronics	$1283.6	75.97%	$33.8		$807.5	$355.9
Unknown	$1212.6	80.24%	$0.7		$1,211.2	$0.7
Misc. mfg. prods.	$1183.2	84.41%	$10.1		$683.0	$472.8
Textiles/leather	$947.0	87.75%	$324.0		$555.6	$67.4
Other ag prods.	$919.3	90.99%	$13.7		$886.0	$19.1
Pharmaceuticals	$871.1	94.06%	$9.0		$475.7	$333.9
Transport equip.	$856.4	97.08%	$67.7		$698.1	$50.2
Other foodstuffs	$828.9	100.00%	$5.8		$820.5	$2.7
Total	**$28,372.4**		**$6,659.8**	**$47.2**	**$19,467.2**	**$1,937.4**

Source: Extracted from 2002 Freight Analysis Framework (FAF) Database for South Dakota, Federal Highway Administration

4.3 Saskatchewan

4.3.1 Population and Employment

Saskatchewan is one of Canada's three Prairie Provinces. Table 4 - 13 shows population estimates for Canada, Saskatchewan, and Saskatchewan's two largest cities. Saskatchewan has a population of 978,933, which is 3.26 percent of Canada's total population. The largest city in Saskatchewan is Saskatoon, having a population of 225,927. The second largest city is Regina, Saskatchewan's capital, with a total population of 192,800. Regina is situated about 107 miles north of the Port of Raymond, making it the study area's nearest large population and trade center.

Table 4 - 13 also shows employment estimates for the country, the province, and Saskatchewan's two largest cities. About half of Canada's population is part of the labor force as is the case in Saskatchewan. Regina and Saskatoon both have slightly higher employment rates.

Table 4-13: Population and Employment in Saskatchewan and Canada, 2001

		Saskatchewan			Canada
		Total	Regina	Saskatoon	
Total Population	Number	978,933	192,800	225,927	30,007,094
	% of Country	3.26%	0.64%	0.75%	—
Employment	Number	504,020	105,105	122,900	15,576,565
	% in Labor Force	51.49%	54.52%	54.40%	51.91%

Source: Statistics Canada, 2001 Census

4.3.2 Industry Structure

Saskatchewan's main industries are the health and education sector and the agriculture and other natural resources sector (see Table 4 - 14). Each of these sectors makes up a little over 18 percent of total employment. Canada's agriculture industry is over 10 percent concentrated in Saskatchewan.

Regina's main industries are business services and health and education, with each of these sectors making up over 18 percent of total employment. The wholesale and retail trade sector makes up almost 16 percent of total employment in Regina.

Table 4-14: Employment by Industry in Percent of Total Employment, 2001

Industry	Regina	Saskatchewan	Canada	Saskatchewan as % of Canada
Agriculture and other resource-based industries	3.77%	18.27%	5.50%	10.75%
Manufacturing and construction industries	10.33%	11.23%	19.60%	1.85%
Wholesale and retail trade	15.97%	14.57%	15.67%	3.01%
Finance and real estate	8.76%	5.02%	5.75%	2.83%
Health and education	18.16%	18.29%	16.26%	3.64%
Business services	18.42%	12.87%	17.94%	2.32%
Other services	24.59%	19.75%	19.28%	3.31%

Source: Statistics Canada, 2001 Census

In recent years, the Province has experienced a significant increase in oil exploration activities. In Alberta, oil & gas and oil sands projects account for the majority of the region's economic growth. There is great potential for growth in the future because of the substantial oil sands deposits in the region.

4.3.3 Traffic and Freight Movements

Table 4 - 15 shows traffic levels on the primary provincial highway network, as of 1996. Quebec and Ontario have the highest levels of average annual daily traffic. Saskatchewan's AADT levels are well below these levels.

Table 4-15: Traffic Levels on the Primary Provincial Highway Network, 1996

	Network Length (Thousands)			1996 Vehicle-kilometers (Billions)			Percent Distribution						Average Annual Daily Traffic		
							Network Length (Thousands)			1996 Vehicle-kilometers (Billions)					
	NHS	Other	Primary	NHS	Other	Primary	NHS	Other	Primary	NHS	Other	Primary	NHS	Other	Primary
Newfoundland	0 9	-	0 9	1.3	-	1.3	3 9	-	1.1	1.6	-	0 9	3,800	-	3,800
Prince Edward Island	0.1	0.3	0.4	0 2	0 4	0 7	0.5	0 5	0.5	0.3	0 7	0 5	5,200	3,800	4,200
Nova Scotia	0.9	0.6	1 4	2 7	0.9	3 6	3 6	1	1 7	3 4	1 4	2 5	8,300	4,300	6,800
New Brunswick	0.9	1 1	2	2.3	1.3	3 6	3 9	1 8	2.4	2.9	2 1	2 5	6,700	3,400	5,000
Quebec	3	8.5	11 5	19.9	14.9	34 8	12.1	14.6	13.9	25 2	23 4	24 4	18,500	4,800	8,300
Ontario	5	11.5	16 5	28.7	23 2	51 9	20.5	19 8	20	36 2	36 5	36.3	15,700	5,500	8,600
Manitoba	0.9	6.4	7.3	1.5	3 2	4 7	3.5	11	8.8	1.9	5	3.3	4,800	1,400	1,800
Saskatchewan	2.1	13.9	16	3.1	4.9	8	8.6	23 8	19.3	3.9	7.7	5.6	4,000	1,000	1,400
Alberta	3 5	10 2	13.7	8 4	6 4	14.9	14.5	17.5	16 6	10 6	10 1	10 4	6,500	1,700	3,000
British Columbia	5 4	4.8	10 2	10 8	8 4	19.2	22	8 3	12.3	13.6	13 1	13.4	5,500	4,800	5,200
Yukon	1.1	0 7	1.8	0.2	0.1	0.3	4 4	1.2	2.2	0.3	0.1	0.2	600	300	500
Northwest Territories	0.6	0.2	0.8	0.1	0	0.1	2.4	0.4	1	0.1	0	0 1	300	50	300
Canada	**24.3**	**58.2**	**82.5**	**79.3**	**63.8**	**143**	**100**	**100**	**100**	**100**	**100**	**100**	**8,900**	**3,000**	**4,700**

Source: Transportation in Canada 2000, Transport Canada, 2000

Table 4 - 16 shows for-hire truck traffic by sector and province in Canada. Manitoba, Saskatchewan, and territories collectively account for only 7.3 percent of total tonne-kilometers traveled. Ontario and Quebec have the highest levels of truck traffic, respectively.

Table 4-16: For-Hire Truck Traffic by Sector and Province, 2004, Billions of Tonne-Kilometers

	Intra-provincial	Inter-provincial	Inter-national	Total	Percent Share
Ontario	12.56	18.3	43.22	74.08	40.1
Quebec	7.68	9.73	25.08	42.49	23
Alberta	7.31	9.76	8.59	25.66	13.9
Manitoba, Saskatchewan, and territories	1.81	5.99	5.73	13.54	7.3
British Columbia	3.88	5.54	7.54	16.97	9.2
Atlantic provinces	1.67	4.72	5.84	12.23	6.6
Total	34.92	54.04	96	184.96	100

Source: Transportation in Canada 2004, Transport Canada, 2004

Table 4 - 17 shows that freight transported by truck in Canada has been growing since 1999. For-hire trucking has seen substantial growth since the early 1990s. Between 1993 and 2003, for-hire truck traffic more than doubled, from 84.6 to 185.0 billion tonne-kilometers. The transborder sector was the main contributor to this growth, with an average annual growth rate of 11.4 percent. In fact, by weight, about 65 percent of Canada-US trade movement was by truck. Commodities shipped by truck to/from the US accounted for $335 billion (in Canadian dollars) by value.[29]

Table 4-17: Freight Transported by Truck in Canada, In Thousands

	Freight Transported, In Thousands					Rate of Growth
	1999	2000	2001	2002	2003	
Tonnes transported	269,285	278,442	287,975	293,644	305,153	13.32%
Tonnes-kilometers transported	158,656,177	164,981,978	170,936,593	177,215,621	184,963,662	16.58%
Number of shipments (Units)	36,410	35,561	36,917	38,492	40,259	10.57%

Source: Statistics Canada

In 2003, for-hire truck traffic generated a total of $8.8 billion (in Canadian dollars) for domestic movements and $8.0 billion (in Canadian dollars) for international transport (see Table 4 - 18). The most revenue came from shipments of manufactured goods, accounting for 26 percent of total revenue for commodities shipped by truck. Similarly, manufactured products were the largest contributor to truck traffic (see Table 4 - 19). Agriculture and food products accounted for the second highest levels in terms of both revenue and truck traffic. In fact, the four

[29] See *Transportation in Canada 2004*, Transport Canada, 2004.

commodities with heaviest traffic flows are also the top commodities in terms of revenue generated.

Table 4-18: For-Hire Trucking Activity Revenues by Commodity Group, 2003, Billions of Dollars

SCTG Commodities	Domestic	International	Total	Percent of Total
Misc. and other manufactured products	2.41	1.97	4.38	26
Agriculture and food products	1.61	1.23	2.84	16.9
Forest products	0.99	1.2	2.19	13
Base metal, steel, alloy products	0.71	0.84	1.54	9.2
Plastics & chemical products	0.51	0.88	1.39	8.3
Auto & other transport products	0.62	0.75	1.37	8.2
Machinery and equipment	0.63	0.58	1.21	7.2
Cement & mineral non-metal products	0.35	0.23	0.58	3.4
Ores and non-metallic minerals	0.5	0.07	0.57	3.4
Petroleum products	0.27	0.14	0.41	2.5
Waste & scrap material	0.22	0.12	0.34	2
Total All Commodities	8.82	8.01	16.82	100

Source: Transportation in Canada 2004, Transport Canada, 2004

Table 4-19: For-Hire Trucking Traffic by Commodity Group, 2003, Billions of Tonne-Kilometers

SCTG Commodities	Domestic	International	Total	Percent of Total
Misc. and other manufactured products	20.25	19.64	39.89	21.6
Agriculture and food products	18.21	17.32	35.52	19.2
Forest products	14.3	19.1	33.4	18.1
Base metal, steel, alloy products	7.98	10.49	18.47	10
Plastics & chemical products	5.77	8.74	14.51	7.8
Auto & other transport products	2.13	7.06	9.2	5
Machinery and equipment	3.1	4.47	7.57	4.1
Cement & mineral non-metal products	3.95	3.17	7.12	3.8
Ores and non-metallic minerals	4.23	2.72	6.95	3.8
Petroleum products	5.92	0.88	6.79	3.7
Waste & scrap material	3.12	2.42	5.54	3
Total All Commodities	88.96	96	184.96	100

Source: Transportation in Canada 2004, Transport Canada, 2004

4.3.3.1 Saskatchewan Highway 6 Information

Saskatchewan Highway 6 is a two-lane Primary roadway stretching from the Port of Regway in the south to Regina in the north. Along Primary designated roadways in Canada, the speed limit can vary from 90 kilometers per hour to 110 kilometers per hour depending on the road geometry.

Table 4 - 20 illustrates the weight restrictions for different classifications of Canadian highways.

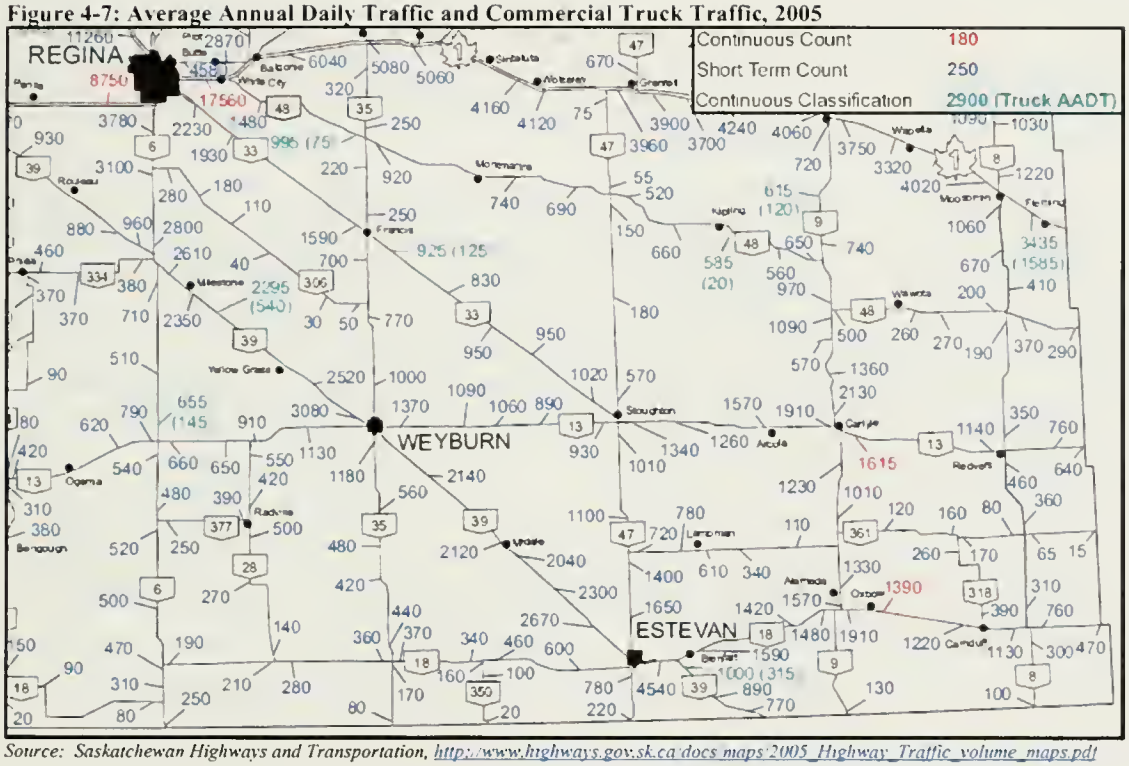
Table 4-20: Saskatchewan Highway Weight Limits by Truck Configuration and Highway Classification

Truck Type	Primary	Secondary	Municipal	Winter Primary	Winter - Secondary and Municipal
Straight truck 2 axles	16,350 kg	13,700 kg	13,700 kg	17,250 kg	15,500 kg
Straight truck 3 axles	24,250	20,000	20,000	25,250	23,500
Straight truck with tandem steering	30,600	25,500	25,000	31,600	29,000
Truck and tandem pony	41,250	34,500	34,500	43,250	41,500
Truck and tridem pony	45,250	40,000	40,000	46,250,	44,500
Truck and full trailer 5 axles	42,450	36,400	36,400	45,250	43,500
Truck and full trailer 6 axles	50,350	42,700	42,700	53,250	51,500
Truck and full trailer 7 axles	53,500	49,000	49,000	53,500	53,500
Tractor and semi-trailer 4 axles	31,600	28,200	28,200	33,500	33,500
Tractor and semitrailer 5 axles	39,500	34,500	34,500	41,500	41,500
Tractor and semitrailer 6 axles	46,500	40,000	40,000	46,500	46,500
A -C Train 6 axles	49,800	44,600	44,600	53,500	53,500
A -C Train 7 axles	53,500	49,000	49,000	53,500	53,500
A -C Train 8 axles	53,500	49,000	49,000	53,500	53,500
C Train 8 axles with approved dolly	60,500	54,500	54,500	60,500	54,500
B Train 7 axles	56,500	49,000	49,000	59,500 (primary and secondary)	54,500 (for municipal)
B Train 8 axles	62,500	54,500	54,500	62,500 (primary and secondary)	54,500 (for municipal)

Source: Saskatchewan Department of Highways

Highway 6 AADT from Regina to the Port of Regway is shown in Figure 4 - 7.

Figure 4-7: Average Annual Daily Traffic and Commercial Truck Traffic, 2005



Source: Saskatchewan Highways and Transportation, http://www.highways.gov.sk.ca/docs/maps/2005_Highway_Traffic_volume_maps.pdf

5: SUMMARY AND CONCLUSIONS

The analysis conducted in Section 2 and 3 leads to the following set of observations and conclusions regarding the current road network and transportation conditions in the study area.

1. The Theodore Roosevelt Expressway is a congressionally designated "high priority trade corridor" running from the Port of Raymond, at its northern extent, to Rapid City, South Dakota, in the south. The TRE includes segments of two highways in Montana: MT 16 (Port of Raymond to Culbertson) and US 2 (Culbertson to North Dakota). The corridor's designation reflects the increasing importance of north-south, truck-borne trade at the national scale. Within Montana, improving the corridor could contribute to enhanced trade activity through a portion of the state that has seen modest and negative growth in recent years, and it would help maintain high standards of safety and service for the affected communities as through-traffic grows.

2. Recent improvements on US 2 in North Dakota constitute a desirable design target. The continuation of a four lane design, as is being completed in North Dakota, would establish continuity of the highway system configuration in an area where the integration of the economies and communities across transparent state lines is already well established. Continuity of the corridor between the current four-lane segment of US 2 and the planned four-lane extension to the Montana border[30] in North Dakota is also important for reasons of roadway competitiveness, strategic transportation functionality, and user perception.

3. The population of the six-county study area declined over the last decade. In the period from the present to 2025, population is expected to increase at a slow to moderate rate compared to the state. Population growth is not expected to be a significant source of traffic pressure in the foreseeable future.

4. Several findings indicate that the study area is part of an economic region that is, now and increasingly, integrated across state and national boundaries. Settlement in the six-county study area is predominantly rural. The area is dotted with small communities, the largest being Sidney at about 4,500. As a consequence, regional consumer trade and work-related traffic appears to flow readily in a broad, two-state area with additional interchanges with southern Saskatchewan. Williston, North Dakota, (pop. 12,200) is the nearest higher-order trade center to the six-county study region of northwestern Montana. Study participants report routinely traveling to that city for consumer purchasing. Professional and financial services are also more concentrated in Williston. The nearest major-order trade center is Regina, Saskatchewan. As travel and border barriers are reduced, more consumer and commercial traffic can be expected to flow that direction. Some key industries, agriculture and oil, appear to be closely integrated across state and national lines, and the local tourism sector clearly relies on people outside the state

[30] Information derived from MDT surveys of regional transportation agencies and their plans for future roadway enhancements. See section 5.1.4 in Working Paper #2: Assessment of Existing and Future Opportunities.

coming to and through the area. All this suggests that there would be local and regional economic advantages from improved and consistent transportation connections to the east, north, and south.

5. Key industries in the study area depend on quality highway transportation, including agriculture, tourism, and the crude oil industries.

6. The oil industry relies on the road network for transportation of inputs, equipment, supplies, and workers. While pipelines are the preferred mode of transporting oil, the pipelines in the study area region are running at capacity. Until additional pipelines are developed, much of the oil produced in the study area is expected to be trucked to purchasers. At both the local and international scales of analysis, the development of facilities related to extraction, processing, and pipeline capacity are likely to generate substantial heavy traffic in and through the local study area.

7. The cost and quality of transportation is a primary factor shaping the course of agricultural development in the area. Agriculture depends on truck transportation to transport farm production from to rail heads or markets. Demand for truck transportation services will increase with growth in agricultural production. Changes in rail transportation – notably the emergence of large grain loading facilities – require grain to be trucked to them over longer distances. Specialized value-added agricultural opportunities rely on the ability to get specialized crop inputs from a wide territory and to ship output to markets efficiently. Transportation improvements could support business expansion and market access, as well as facilitate hauling of products from farms to more distant processing plants, or conversely, shipping crops into the area for specialized processing.

8. Tourism relies on adequate highways to serve attract visitors to Montana and the region. The unusual seasonality of visitor spending data in some parts of the study region suggests that hunting may be the area's largest advantage today. During summer months, the Fort Peck Reservoir is one of the state's leading attractions. Other attractions in the study area include the Dinosaur Trail, and the Montana Cowboy Hall of Fame. By and large, the region's tourist traffic today appears to be less oriented to specific destinations as to activities that are widely dispersed in the broader territory. Most visitors traveling to the area are from neighboring states, and in many cases there are substitute activities along alternative routes. The attractiveness and safety of local highways, real and perceived, affect individuals' choices to travel to and through the region.

9. The region has significant opportunities for energy development. Northeastern Montana is the largest oil exploration area in Montana, and much of the exploration activity is concentrated within the study area. In addition to the oil and gas industry, the state is rich in natural resources, such as wind energy and has additional development potential bio-energy resources, such as bio-diesel and ethanol production. With the recent renewed interest in natural resources, the area has great potential for growth in this sector.

10. While the origin and destination structure of commodity shipments in Montana indicates that about 50 percent of commercial shipments are within-state shipments (i.e.: they originate in Montana and go to a Montana destination), this may be a result of counting intermediate destinations as final destinations. This high rate could be due to many shipments in the state being initially shipped to storage locations (i.e.: grain silos) prior to shipment to the final market.

11. Road congestion in the study area at the present time is minimal compared to the national average. Although travel is increasing, congestion at the levels at which significant slow-downs in speed may occur currently affect only a small percentage of road sections. Despite low congestion, today, safety concerns due to mixed truck and auto traffic are still an issue. These concerns may be especially pertinent if truck traffic in the area were to increase.

APPENDIX A: SUPPORTING MATERIAL

Table A-1: Total Crop Acres Planted in the 6-County Study Area

Crop	Crop Acres in the 6-County Study Area							
	1990	1995	1998	2001	2002	2003	2004	2005
Fallow Acres	1,146,129	—	1,068,406	749,684	687,690	648,548	615,673	579,120
CRP Acres	865,327	874,546	866,566	956,317	951,144	949,844	935,953	942,267
Field Peas Acres	13	1,651	5,146	14,542	22,181	21,921	51,900	116,252
Lentil Acres	110	851	3,594	13,226	16,759	21,195	68,409	134,582
Chick Peas Acres	—	—	1,226	15,738	8,700	1,931	1,480	5,639
Alfalfa Acres	63,076	58,445	24,351	38,672	43,580	43,975	47,825	52,648
Flax Acres	1,184	1,247	7,093	10,403	14,147	15,092	17,846	49,933
Canola Acres	1,653	8,819	3,841	37,752	28,007	18,931	9,830	11,198
Safflower Acres	15,774	13,090	23,733	17,191	23,750	23,457	18,669	18,270
Sunflower Acres (Oil and Non-Oil)	0	100	1,056	197	341	638	4,321	4,877
Soy Bean Acreas	14	141	21	80	57	1,721	3,023	317
Sugar Beat Acres	19,001	18,007	23,746	25,653	24,780	20,777	—	19,855

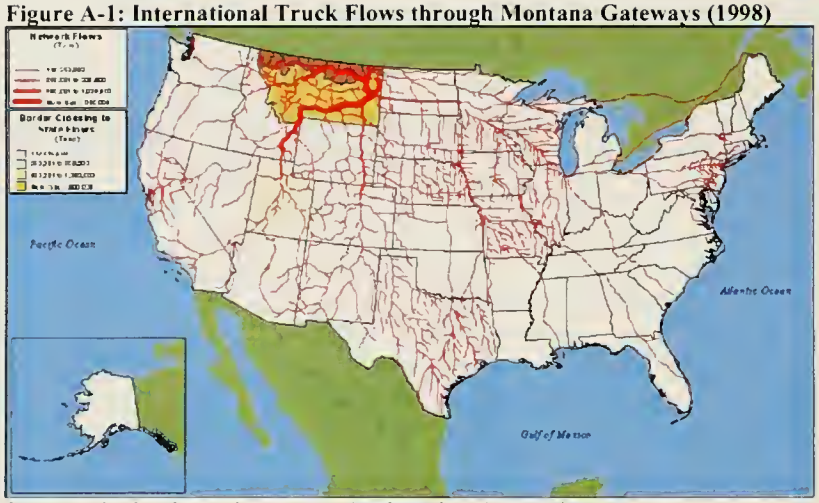
Source: Mon-Dak Ag Frontier, Williston Herald, August 2006

Table A-2: Top Trading Partners, 2002

Tons (Millions)			Value ($ Millions)		
	Number	Percent		Number	Percent
Total	95.9	100	Total	28,221.3	100
Foreign	14 7	15	Foreign	3,315.5	12
Domestic	81 2	85	Domestic	24,905.7	88
North Dakota	18 2	19	North Dakota	5,848.9	21
Minnesota	15.3	16	Washington	2,016.9	7
Wisconsin	12 6	13	New Jersey	1,545.6	5

Source: 2002 Freight Analysis Framework (FAF) Database for Montana, Federal Highway Administration

Figure A-1: International Truck Flows through Montana Gateways (1998)



Source: Federal Highway Administration, Freight Analysis Framework

Figure A-2: International Truck Flows through North Dakota / Western Minnesota Gateways (1998)

Source: Federnl Highway Administration, Freight Analysis Frnmework

Table A-3: Shipments from and to Montana, by Mode, for Geographic Shipment Category

Geographic Category of Shipments	Total Tonnage of Shipments				Total Value of Shipments			
	Rail	Truck	Pipeline	Other	Rail	Truck	Pipeline	Other
Domestic Shipments Originating in Montana	48,813	43,145	38,502	564	$1,652	$17,570	$7,036	$1,058
Cross-border Shipments Originating in Montana	616	390	94	7	$70	$175	$17	$3
Overseas Shipments Originating in Montana	3,364	93	0	92	$152	$28	$0	$28
Total Shipments Originating in Montana, by Mode	52,793	43,628	38,596	664	$1,874	$17,773	$7,053	$1,089
Domestic Shipments with Montana Destination	5,447	43,722	19,749	160	$239	$23,667	$2,028	$2,984
Cross-border Shipments with Montana Destination	606	1,389	7,729	2	$106	$582	$1,169	$5
Overseas Shipments with Montana Destinations	2	325	1	4	$1	$936	$3	$41
Total Shipments with Montana Destinations, by Mode	6,055	45,436	27,479	166	$346	$25,184	$3,200	$3,031

Source: Extracted from 2002 Freight Analysis Framework (FAF) Database for Montana, Federal Highway Administration

Table A-4: Shipments to, from, and within Montana, by Mode, 2002

	Tons (Millions)						Value ($ Millions)					
	Within State		From State		To State		Within State		From State		To State	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Total	59.5	100	76.2	100	19.7	100	15,663.9	100	12,124.2	100	16,097.0	100
Truck	36.6	62	7.0	9	8.8	45	13,907.8	89	3,864.9	32	11,276.7	70
Rail	4.4	7	48.4	63	1.6	8	122.2	<1	1,751.6	14	223.8	1
Water	<0.1	<1	<0.1	<1	<0.1	<1	<0.1	<1	0.2	<1	<0.1	<1

Air, air and truck	<0.1	<1	0.1	<1	<0.1	<1	7.1	<1	96.4	<1	362.2	2
Truck and Rail	<0.1	<1	<0.1	<1	<0.1	<1	1.7	<1	5.1	<1	162.7	1
Other Intermodal	<0.1	<1	0.5	<1	0.1	<1	307.9	2	669.6	6	2,189.2	14
Pipeline/ Unknown	18.3	31	20.3	27	9.1	46	1,317.2	8	5,736.5	47	1,882.5	12

Source: 2002 Freight Analysis Framework (FAF) Database for Montana, Federal Highway Administration

Table A-5: Total Shipments to, from, and within Montana, by Commodity, 2002

Tons (Millions)						Value ($ Millions)					
Within State		From State		To State		Within State		From State		To State	
Total	59.5	Total	76.2	Total	19.7	Total	15,663.9	Total	12,124.2	Total	16,097.0
Coal	19.2	Coal	39.3	Coal, n.e.c.[1]	9.7	Machinery	2,682.3	Coal, n.e.c.	5,576.4	Mixed freight	2,341.1
Cereal grains	8.4	Coal, n.e.c.	19.1	Wood prods.	1.4	Gasoline	1,642.3	Wood prods.	1,021.3	Machinery	1,883.8
Gasoline	5.8	Nonmetallic minerals	3.9	Cereal grains	0.9	Unknown	1,176.0	Misc. mfg prods.	533.9	Coal, n.e.c.	1,692.1
Logs	3.6	Cereal grains	3.3	Mixed freight	0.9	Mixed freight	1,129.2	Machinery	492.4	Misc. mfg. prods.	1,669.9
Fuel oils	2.7	Wood prods	2.9	Chemical prods.	0.6	Live animals/fish	1,010.4	Coal	454.3	Chemical prods.	1,216.5

Source: 2002 Freight Analysis Framework (FAF) Database for Montana, Federal Highway Administration

APPENDIX B: ANNOTATED BIBLIOGRAPHY AND DATA SOURCES

The purpose of this appendix is to outline the sources from which we have collected background information. We have organized this annotated bibliography into four sections: research papers, newspaper articles, data sources, and other.

Research Papers

Cambridge Systematics with Economic Development Research Group, ICF Consulting, and Short Elliot Hendrikson, "Montana Highway Reconfiguration Study," May 2005, p. 3-27 – 3-33

> The Reconfiguration Study was conducted to assess the potential economic benefits resulting from improvements to Montana's highways. The focus of the study was to look at the effects of expanding Montana's two-lane state highways. To analyze the economic benefits resulting from improvements to the highways, the Highway Economic Analysis Tool (HEAT) was created. The study found that many industries, such as oil and industrial machinery firms, felt that the highways already met their transportation needs. However, in industries such as mining, lumber/wood, and farming, improved roadways are seen as being necessary for industry growth. Food processing firms, for example, complain of high freight costs impeding their industry's growth, suggesting that roadway improvements are necessary. Suppliers in the lumber/wood industry are heavily reliant on trucking and the current roadway infrastructure will not sustain continued growth in their industry. Some farmers feel that transportation costs in Montana are higher in state than outside of it. Also, lack of direct routes in the state makes receiving supplies costly. Some Montana firms in the farming industry believe that transportation improvements are necessary for business expansion. Trucking is also becoming an increasingly popular means of transporting coal because of high rail costs. With roadway improvements, trucking would become a more viable option for shipments.

Department of Environmental Quality, "Petroleum and Petroleum Products in Montana," March 2003; retrieved from: http://leg.state.mt.us/content/publications/lepo/deq_petroleum_report/reporttext.pdf

> This report details the history of petroleum production in Montana and discusses the current state of refineries and pipelines and consumption figures for petroleum products.

Dillon, Thale (2000, March). "Exploring Tourism Potential: Resident Attitudes in Missouri River Country, Montana," University of Montana, Institute for Tourism and Recreation Research, Research report 74.

> This study reports the structure of tourism in Missouri River Country as well as the opinions and attitudes of residents in this region towards tourism. Missouri River Country includes Daniels, Garfield, McCone, Phillips, Richland, Roosevelt, Sheridan, and Valley Counties. The opinions of residents were collected through a mail-back questionnaire given to 500 residents of the area. It was found that 26% of Montana visitors travel through Missouri River Country. Over $1.58 billion statewide and $52 million in the region were spent by nonresident travelers. The primary purpose for travel to the region was for vacation. Among travelers through Missouri River Country, the top-sited attractions were Glacier National Park and the mountains. Residents in the region tend to feel that the greatest tourist potential is in Fort Peck Lake and its surrounding area and they tend to support promotion of tourism in this area. Also, more than half of Missouri River Country residents are dissatisfied with the current transportation conditions and feel that improvements are necessary, especially with regards to bus service.

Economic Development Research Group, Inc. and Dye Management Group, Inc., "Montana Tran Plan 21 Update - Economic Development Issues and Recommendations," 2002; retrieved from: http://www.edrgroup.com/edr1/library/lib_trans_roads/P076-Montana-tranplan-21.shtml

This paper discusses findings provided by EDR Group assessing the economic benefits of transportation improvements in the state of Montana. In order to evaluate potential economic developments, past economic trends and future economic forecasts for each of the five regions within the state were studied. Also, employment opportunities resulting from such things as technology and transportation changes were investigated. Finally, the study looked at how reliant future economic trends would be on freight and passenger transport in Montana. The study found major technology changes in traditional industries (i.e.: mining, agriculture, food processing) as well as advanced technology sectors, which are reliant on intermodal road-rail and road-air transfers. Also, tourism needs are constantly changing. Thus, EDR Group concluded that, overall, there are opportunities for economic development which would justify expanding some two-lane highways.

Gorman, Ed, "Opportunities and Challenges for Montana's Workforce on New Energy Projects," October 2005; retrieved from: http://energyfuture.mt.gov/presentations/Ed%20Gorman%20-%20MT%20Symposium%2010-18-05.pdf

This report outlines proposed Montana energy projects. It gives the estimated energy output, estimated employment, and estimated costs of each project. One such project is the Wind Hunter Project (a.k.a. Valley County Wind Energy Project) in Valley County, Montana.

Humphreys and Fortowsky, "Estimating Traffic Changes and Pavement Impacts from Freight Truck Diversion Following Changes in Interstate Truck Weight Limits (06-1225) - S25," January 2006, p. 75; retrieved from: http://pubsindex.trb.org/document/view/default.asp?lbid=776776

This study analyzes the pavement, crash, and bridge costs of allowing higher truck weight limits upon a specific Interstate route.

ICF Consulting and AECOM Consulting, "Roosevelt County/Fort Peck Indian Reservation Corridor, Montana," *U.S. Department of Transportation, Federal Highway Administration*, November 2003

This study evaluates the relationship between economic development and highway improvements along US-2 in the Fort Peck Reservation area. Incremental Benefit and Input-Output analysis are used to assess potential benefits resulting from the proposed project. The study first assesses existing conditions and the potential for economic development in the area. Second, transportation needs and investments relevant to wind power, irrigation, tourism, oil and gas development, and manufacturing are evaluated. Finally, investigation of the economic impacts of transportation investments is carried out. The study concludes that further analysis is necessary to warrant the proposed widening of US-2 to a continuous four lane highway. For example, additional studies of tourism in the broader region, safety factors, the need for turn-off lanes for slower vehicles, etc. may justify the project.

ICF Consulting Inc., "U.S. 2, Havre to Fort Belknap E.I.S., Existing Economic Conditions Report," PLH-TCSP 1-66(44)384, Control Number 4951, June 2003

This report assesses current economic conditions for the US2, Havre to Fort Belknap environmental impact statement. After identifying existing economic baseline conditions, a comparison of the economic impacts of various alternatives to these baseline conditions was conducted using a benefit-cost analysis. The study finds that transportation factors have been a factor in failed business ventures, but that the condition of the US 2 segment under investigation has not been a reason for these business failures. So, it is concluded that significant regional economic benefits will not be generated from major capacity improvements. However, improvements to the operation and safety of US 2 (i.e.: wider shoulders, new turning lanes) are worthwhile investments as they are necessary for sustaining the economy in the region. The study methodology involved identifying initiatives that could potentially generate economic growth and assessing their relationship to US2 improvements. Site visits and interviews were conducted to collect this information.

Cooper, "A Critical Review of the U.S. 2, Havre to Fort Belknap, Montana E.I.S. Existing Economic Conditions Report Final Document," July 2004

This paper is a critical review of the past Environmental Impact Study (EIS) concerning the expansion of US 2. It states that the past study, while reporting on existing economic conditions accurately, fails to acknowledge the full future economic possibilities in the area. Some major flaws are: underestimated traffic growth; miscalculation of potential vehicle operating cost savings; lack of a prediction of economic development in the area and of specific Native American demographic trends or employment projections; and the study's focus on a small section (the 45-mile stretch between Havre and Fort Belknap) as opposed to the entire 666 mile highway (from Idaho to North Dakota). Very importantly, the previous study neglects to study potential freight movements between eastern Canada and the Pacific Northwest. The study findings predict that some of the major benefits of the proposed expansion will be employment creation, transportation improvements, and energy issues. Such energy developments include new coal power plants, petroleum refineries, and manufacturing plants, as well as a major electrical transmission line to connect coal and wind generating plants.

Institute for Recreation and Tourism Research, "Attraction Visitors to Missouri River Country Travel Region," University of Montana, Research report 2003-9, May 2003

This report aims to describe summer travel in the Missouri River Country in terms of demographics, trip characteristics, attraction, and travel patterns. The study was conducted through a series of survey questionnaires given to visitors of the area. Some of the major findings include: the main purpose for visiting the area was vacation; the majority of people visiting Missouri River Country went to museums and the most visited attraction in the area was the Fort Peck Dam and Lake; the average duration of stay was about 7 nights in Montana and 4 nights in Missouri River Country; most visitors were couples; more than half of the visitors were from out of the state, with the majority visiting from Washington; about half of the visitors planned to visit a National Park (Glacier or Yellowstone).

Institute for Recreation and Tourism Research, "The Economic Review of the Travel Industry in Montana," University of Montana, 2004 Edition, July 2004

This report describes the current state of tourism in Montana and the impact of the travel industry on the state as a whole.

Institute for Recreation and Tourism Research, "Niche News: Richland County Visitor Characteristics," University of Montana, June 2004

Niche news is a summary sheet of key findings extracted from the Institute for Recreation and Tourism Research reports.

Institute for Recreation and Tourism Research, "Regional Nonresident Spending in Montana," University of Montana, Research report 75, March 2000

This report provides an analysis of nonresident spending in various Montana counties.

Institute for Recreation and Tourism Research, "Valley County Explores Tourism Potential," University of Montana, 1999 Montana Community Tourism Assessment Process, Research report 71, January 2000

This report describes tourism in Valley County, Montana in terms of present levels of travel in the region, trip characteristics, and residents' views of tourism in the state and the county. The study was conducted through a series of mail-back questionnaires distributed to both residents of the state and more specifically to residents of Valley County in October and November of 1999. Some of the major findings regarding tourists include: about 5 percent of the over 3.8 million visitors of Montana traveled through Valley County; over $1.5 billion and about $6.6 million was spent by tourists to the state and county respectively;

most visitors were in Montana for vacation as opposed to for visiting relatives and friends; primary attraction in the region were Glacier National Park, the mountains, fishing, and Yellowstone National Park; tourists in the region spent the most money on gas and oil, lodging, and in restaurants/bars. Valley County residents tend to feel that tourism should be more heavily promoted in Montana (especially through hunting and fishing activities) as it will encourage economic development in the region.

R.L. Banks & Associates, Inc. with Railroad Industries Inc., "Rail Freight Competition Study as Provided by Montana Senate Bill (SB) 315," October 2004

This study discusses Montana's lack of rail freight competition and analyzes some possible improvements. In 1970, four railroads were merged into one, and Burlington Northern Railroad was created. Today, there are only two large Class-1 railroads: Burlington Northern Santa Fe (BNSF), which dominates over 90% of rail use, and Union Pacific (UP). This limited competition is one of the main factors in high rail rates, since there is no need to make rates competitive. Lower rates are very important because they would increase the likelihood of moving goods by rail in Montana. However, lack of competition is not the only factor causing rates to be high. Other issues discussed in this study are Montana's relatively small transportation markets, its geographic position, Staggers Rail Act (which allows railroads to set their own rates based upon market value of service), and the limited transportation options in Montana. Thus, intermodal (truck-trail and trail-truck) movement in Montana is not keeping up with the nationwide trend. The substantial benefit of using shuttle trains in Montana is also discussed. Shuttle trains (a.k.a. unit trains) are high-capacity freight trains consisting of only a single shipment. They will ensure the feasibility of wheat export in the near future.

R.L. Banks & Associates, Inc. with Railroad Industries Inc., "Montana Branch Line Study: Phase I – Plentywood-Scobey and Glendive-Circle," June 2004

This study investigates the impacts of closing two railroad segments in Montana: the Plentywood-Scobey line (located in northeast Montana) and the Glendive-Circle line (located in the eastern central portion of Montana). Interviews were conducted and previous reports (of the area and of other states that had faced similar situations) were researched to understand the impacts of rail line abandonment. Some important impacts of the closing of these lines are the inability for grain producers to carry grain to the next closest elevator, the necessity of acquiring semis for transport, and increased truck traffic on highways. In the interviews, farmers complain about the high prices of rail movement and thus the high cost of grain transport. Also, much truck movement has been observed since the cessation of rail service on these two lines. It has been found that what has proven economically beneficial is for the state to assist small railroads and acquire abandoned rail lines.

R.L. Banks & Associates, Inc. with Railroad Industries Inc., "Montana Branch Line Study: Phase II – Other at Risk Lines," September 2004

This study evaluates the top ten at-risk rail lines both from the standpoint of County Commissioners, rail shippers, railroads and from a financial standpoint. It evaluates the future prospects of these rail lines and makes recommendations for ways to improve the conditions at these locations so as to preserve rail service. One of the at-risk lines is on the BNSF Bainville - Plentywood rail line (located in northeast Montana). The main predictor in evaluating whether a rail line is at-risk is the number of carloads (traffic revenue) per mile.

Saskatchewan Highways and Transportation, "Regway/Raymond Border Crossing Study," January 2000

This study looks at international commercial truck traffic at the Port of Regway/Raymond in 1998/1999. Truck operators were surveyed in Canada and US Customs at the port as a means of data collection. The major findings of the study are as follows: the majority of truck movements were out of Canada; the majority of movements were between Montana and Saskatchewan; and most trucks into the US were loaded while most trucks into Canada were empty.

Tolliver, Denver, Alan Dybing, and Subhro Mitra, "Trip Generation Rates for Large Elevators: A North Dakota Case Study," January 2006; retrieved from: http://www.trb.org/am/ip/paper_detail.asp?paperid=11852

This is case study examining truck trips generated by large shuttle facilities in North Dakota.

Transport Canada, "Transportation in Canada 2004 (and 2000)," 2004 (and 2000); retrieved from: http://www.tc.gc.ca/pol/en/anre/menu.htm

This is an annual report published by Transport Canada discussing the current state of transportation in the Country.

Department of Environmental Quality, "Fact Sheet: Valley County Wind Energy Project;" retrieved from: http://deq.mt.gov/MFS/WindHunter/application/FACTSHEETwmap.pdf

This document describes the proposed Valley County Wind Energy Project. Wind Hunter LLC will be in charge of the building, operation, and maintenance of the wind turbines in north-central Valley County. The purpose of the project is to provide electrical power around Montana. The project is organized into four phases (ending in 2016). The first phase (to be completed in 2008) will generate 50 MW of electricity using 33 turbines, which is enough energy to provide power to about 25,000 homes. Construction is planned to begin in spring 2007.

Grain Transportation Report, August 2005; retrieved from: http://www.ams.usda.gov/tmdtsb/grain

This report is published weekly and summarizes news affecting grain movements. It also provides updates on volume and price data for barges, railroads, trucks, and ocean vessels transporting grain.

US Department of Transportation, "Highway Statistics 2004 (and 2000)," 2004 (and 2000); retrieved from: http://www.fhwa.dot.gov/policy/ohim/hs04/index.htm

This is an annual report presenting statistics pertaining to highway transportation, particularly highway use, highway finance, and various other highway characteristics.

US Department of Transportation, "Western U.S. – Canada Crossborder Case Study," U.S. DOT Comprehensive Truck Size and Weight Study, Report number 5, December 1995

This report describes the truck size and weight regulations for trucks traveling between the western US and Canadian border. The study aims to determine the effects of some of these requirements on the trucking industry.

Newspaper Articles

Falstad, Jan, "State clocks 4% growth in economy," *Billingsgazette.com*, February 2006; retrieved from: http://www.billingsgazette.net/articles/2006/02/01/news/state/25-econ-growth.txt

This article reports on Montana's economic growth resulting from the Eastern Montana oil boom and higher global metal prices. A 4% growth in the economy, which is expected to continue through 2009, is higher than the national average. Additionally, cattle prices in 2005 were strong and are expected to be strong in 2006 also. Housing prices, retail sales, and tourism were all up.

Federal Highway Administration, "State Profile – Montana;" retrieved from: http://ops.fhwa.dot.gov/freight/freight_analysis/state_info/montana/profile_mt.htm

This article describes present and projected future freight activity using the Freight Analysis Framework. It provides data on: freight shipments to, from, and within Montana by mode with respect to weight and value of shipments; the top five commodities shipped to, from, and within Montana with respect to weight and value; and some traffic flow estimates.

Kline, Larry, "Highway 2 Association hasn't given up the fight," *Havre Daily News*, January 2006; retrieved from: http://www.havredailynews.com/articles/2006/01/17/local_headlines/highway2.txt

Highway 2 Association's president discusses the hope of widening US-2. There have been some recent economic developments in Havre, such as the building of 2 motels, increased oil and gas exploration, and increased presence of US Customs and Border Protection. The Association pushes the fact that expanding business in the US has been closely related to proximity to four-lane highways, so a four-lane highway is necessary to economic prosperity in Montana. In addition, safety is a concern on the highway since much agricultural equipment is carried. Finally, the north route along US-2 would be beneficial to trucking companies with regards to both time and fuel; the southern route (I-90 and I-94) has many more hills.

Miller, Jared, "'4 for 2' defenders criticize governor, MDT draft review," *Great Falls Tribune Online*, July 2004; retrieved from: http://www.greatfallstribune.com/news/stories/20040714/localnews/840475.html

This article reports on a public hearing discussing improving US-2 to a four-lane highway. Members of the Highway 2 Association are fighting in favor of the proposed improvements to the highway. However, they are facing against much opposition. Some important state officials are against the four-lane widening and members of the Highway 2 Association believe they are impeding approval of the project. The draft Environmental Impact study that was published judged the four-lane expansion unnecessary, and members of the association released a critical review of the report.

The Associated Press, "Governors to Discuss Need for Better Oil Infrastructure," May 2005; retrieved from: http://www.helenair.com/articles/2006/04/18/montana/08mt20060418001.txt

This article discusses the inadequacy of the current pipeline infrastructure in Montana.

Data Sources

Bureau of Labor Statistics (1996-2005 Estimates); retrieved from: http://www.bls.gov/

This agency provides statistics related to standard economic and demographic indicators, such as: real GDP, personal income, population, and unemployment rates.

Canada Border Services Agency; retrieved from: http://www.cbsa-asfc.gc.ca/contact/listing/offices/office616-e.html

The Canada Border Services Agency (CBSA) provides information cross-border and international trade.

Energy Information Administration (1982 – 2005 Estimates); retrieved from: http://tonto.eia.doe.gov/dnav/pet/pet_crd_crpdn_adc_mbbl_m.htm

This agency provides various energy statistics from the U.S. Government, such as information on crude reserves and production, crude oil prices, refining and processing, imports/exports and movements, and consumption/sales.

Freight Analysis Framework (2002 Estimates), compiled by the U.S. Department of Transportation; retrieved from: http://ops.fhwa.dot.gov/freight/freight_analysis/faf/index.htm

This database contains region-to-region commodity flow data for the entire country. It provides various statistics, including the volume of freight by mode of transportation and commodity type.

Highway Performance Monitoring System (1980-2004 Estimates), compiled by the Federal Highway Administration; retrieved from: http://www.fhwa.dot.gov/policy/ohpi/hpms/index.htm

This database provides an array of highway statistics, including data on roadway condition, extent of use (traffic volumes), congestion levels, and operating characteristics.

Montana Department of Commerce; retrieved from: http://commerce.mt.gov/censusresources.asp

This agency provides demographic and economic data on the State of Montana, including current estimates and projections for state population, housing, income, employment, gross state product, and personal income.

Montana Department of Transportation; retrieved from: http://www.mdt.mt.gov/

This agency provides transportation statistics for the state as well as publications of various projects and studies.

Montana Oil and Gas (2000-2004 Estimates), Annual Report, compiled by the Montana Board of Oil and Gas; retrieved from: http://bogc.dnrc.state.mt.us/annualreviews.asp

This Montana Board of Oil and Gas provides an annual report which supplies oil, gas, and Underground Injection Control (UIC) data, including basic well, production, disposition, injection, and inspection information.

National Agricultural Statistics Service (2004 Estimates, 1997 and 2002 Census of Agriculture), compiled by the United States Department of Agriculture; retrieved from http://www.nass.usda.gov/

This agency provides statistics pertaining to agriculture in the United States. Data at the U.S. and State level for various agricultural goods, such as crop, livestock, and farm numbers are supplied. The Census of

Agriculture is conducted every five years, and provides agricultural data (farm numbers, acres of farmland, market value of land and equipment, value of sales, crop and livestock numbers, etc.) for every county in the Nation.

North Dakota Department of Transportation; retrieved from: http://www.dot.nd.gov/

This agency provides transportation statistics for the state as well as publications of various projects and studies.

Statistics Canada (2001 Census); retrieved from: http://www.statcan.ca/start.html

This agency provides data from the censuses of population and of agriculture. Census data is collected every 5 years.

South Dakota Department of Transportation; retrieved from: http://www.sddot.com/

This agency provides transportation statistics for the state as well as publications of various projects and studies.

U.S. Census Bureau (1990-2004 Census and Estimates); retrieved from: http://www.census.gov/

This agency provides demographic data; including current estimates and forecasts of future population. Census data is collected every 10 years; annual updates are available for some series.

US Customs and Border Protection; retrieved from: http://www.cbp.gov/

This agency provides information relating to international trade.

U.S Department of Transportation, Bureau of Transportation Statistics, Transborder Surface Freight Database; retrieved from: http://www.bts.gov/programs/international/transborder/

This database provides trade data for North America by commodity type and surface mode of transportation.

Williston Herald, "Mon-Dak Ag Frontier," August 2006

This magazine provides data relevant to agricultural production in northeastern Montana and northwest North Dakota.

Other

American Wind Energy Association; retrieved from: http://www.awea.org

The American Wind Energy Association aims to promote growth in wind energy through advocacy, communication, and education.

BIODIESEL, The Official Site of the National Biodiesel Board; retrieved from: http://www.biodiesel.org

The website provides information on the biodiesel industry.

The Montana Symposium: Energy Future of the West, Montana's Energy Symposium, October 2005; retrieved from: http://www.energyfuture.mt.gov

The American Wind Energy Association aims to promote growth in wind energy through advocacy, communication, and education.

Working Paper #2:

Assessment of Existing & Future Opportunities

Montana Department of Transportation

TRANSPORTATION REGIONAL ECONOMIC DEVELOPMENT

TRED

THEODORE ROOSEVELT EXPRESSWAY

Working Paper #2: Assessment of Existing and Future Opportunities

Final

Prepared by:
HDR | HLB Decision Economics Inc.

8403 Colesville Road, Suite 910
Silver Spring, Maryland 20910
Tel: (240) 485-2600
Fax: (240) 485-2635

April 2007

DISCLAIMER

Some of the claims and conclusions presented in this report are based on interviews conducted by the research team between May and July 2006. Whenever possible, data and technical analysis are provided in the report to substantiate these claims. When no data or analysis is provided, please remember that further analysis is necessary to determine whether the claim is supported by the facts.

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1: INTRODUCTION

In August 2005, Congress designated the portions of MT 16 from the Port of Raymond to Culbertson and US 2 from Culbertson to the North Dakota border as segments of the Theodore Roosevelt Expressway (TRE) "High Priority Corridor." The TRE is one of 80 corridors in the United States that have received similar designations. The TRE makes up the northernmost segment of a 2,236 mile corridor that, together with the Heartland Expressway and the Port to Plains Trade Corridor, compose the "Great Plains International Trade Corridor" (see Figure 1). This corridor spans nine central US states, beginning in the south at the Port of Laredo in Texas and ending in the north at the Port of Raymond in Montana. This study's focus is the Montana segment of the TRE corridor.

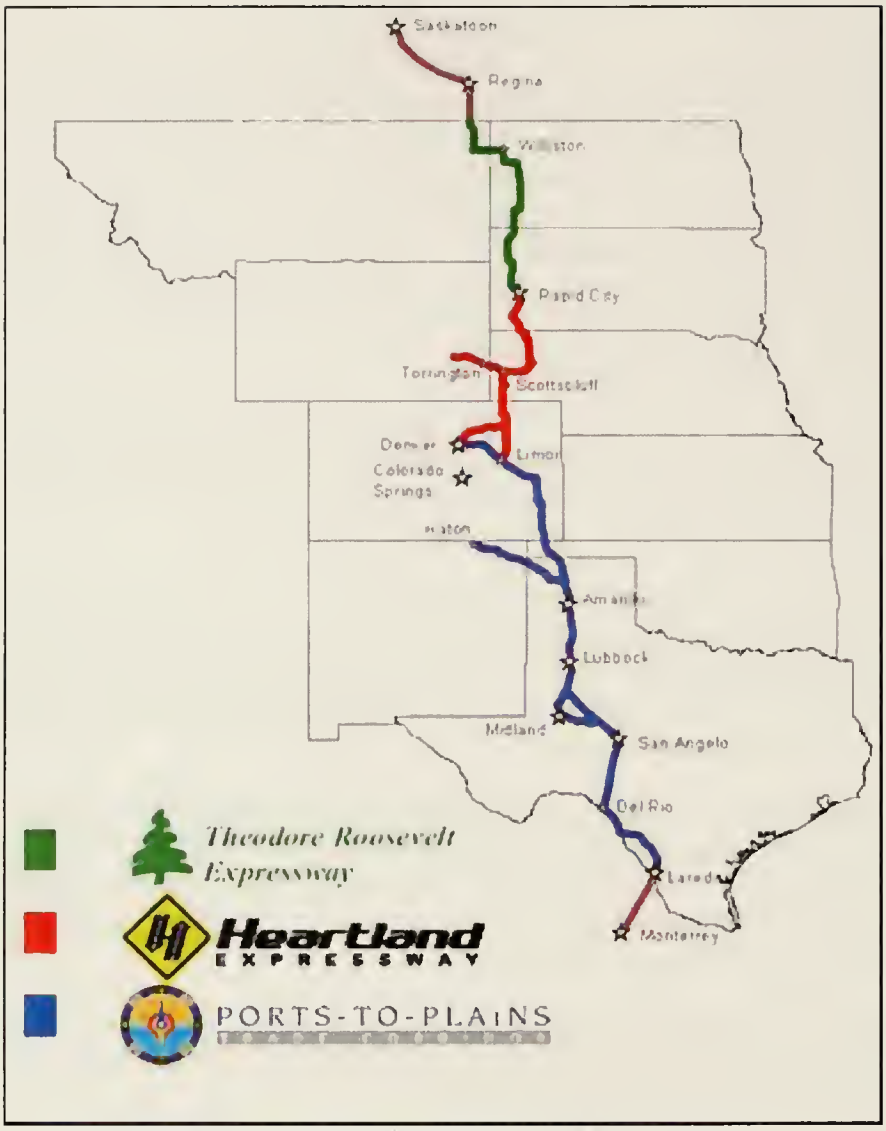
This Working Paper is a part of the US 2/MT 16 Theodore Roosevelt Expressway Development Study. The purpose of the study is to identify the economic, regulatory, or operational changes that would result in traffic and safety conditions justifying the expansion of the Theodore Roosevelt Expressway section in Montana to a 4-lane facility.

This Working Paper includes an overview of existing opportunities for growth (economic or purely traffic related) in the region along with impediments that could challenge that potential growth. The paper also presents an assessment of the existing traffic conditions and their impact on the local economy. Furthermore, potential economic developments within the area, arising from highway expansion, are also assessed in this Working Paper.

The research utilizes a combination of national, regional and local data on opportunities in key industries within the study area, namely agriculture, energy, tourism, transportation, and retail trade. Telephone interviews were conducted to gain an understanding of existing economic conditions and opportunities for structural changes in the regional and local economy. The interview process is discussed in section 1.1.

Section 2 of this paper focuses on agriculture opportunities within the study area. Sections 3, 4, and 5 discuss energy, tourism, and transportation opportunities, respectively. Section 6 describes retail trade and other opportunities in the study area.

Figure 1: Great Plains International Trade Corridor



Source: http://www.portstoplains.com/graphics/GPITC_MAP_12_05.pdf

1.1 Interview Process

To gain an understanding of existing conditions in the region, interviews were carried out with local and regional developers and planners, representatives from the grain, energy, and tourism industries, business owners, freight forwarders and carriers, and elected officials. A total of 120 surveys were conducted to assess how stakeholders view the role that transportation plays and will continue to play in their industries, as well as to inform an assessment of any induced development that could arise from general opportunities or highway improvement. There was an effort to reach out to different parts of the community to gain a firm understanding of opportunities within the area. The sample of participants was comprised mainly of stakeholders from companies and agencies located in Montana, North Dakota, and Saskatchewan. Table 1 on the following page presents some of the institutions that participated in the interview process.

Questions were asked pertaining to the existing structure and operational organization of the region's economy and related to the likelihood of future structural economic changes. More specifically, the questionnaire included questions on:

- Current operations;
- Current and future (planned) utilization of the MT 16/US 2 corridor (route preferences);
- Current impediments to business expansion or re-organization (including production and transportation capacity constraints, and institutional or regulatory impediments);
- Potential expansion or restructuring plans under the current MT 16/US 2 configuration; and
- Potential changes in the outlook for industry expansion or restructuring under a four-lane MT 16/US 2 configuration.

Table 1: Data Collection – Sample Institutions

AGRICULTURE:

- Eastern Agricultural Resource Center, Montana Agriculture Experiment Station
- The Sidney Area Chamber of Commerce and Agriculture
- Montana Department of Agriculture, Agricultural Development Division
- Country Foods, Inc.
- College of Agriculture and Montana Agriculture Experiment Station
- Montana Wheat and Barley Committee
- Montana Department of Agriculture
- USDA's National Agricultural Statistics Service Montana Field Office
- Northwestern Agricultural Research Center, Montana State University
- Superior Grains Inc.
- Montana Grain Growers Association
- Montana Conservation Districts
- Mosaic Canada
- Sheridan County Commissioners
- Columbia Grain
- Busch Agriculture Resources Inc.
- Sitting Bull Auction

ENERGY:

- Montana Association of Oil, Gas and Coal Counties
- Ethanol Producers and Consumers (EPAC)
- Encore Acquisition Company
- New Harvest Energy, LLC
- Cypress Agri-Energy Inc.
- Sheridan Electric Cooperative
- Montana Electric Cooperatives Association (MECA)
- Continental Resources Inc
- Eastern Plains RC&D
- Two Rivers Economic Growth, Inc.
- Greenslade Consulting Group
- Lower Yellowstone Electric REA
- Economic Development Alliance of South East Alberta
- O'Toole Law Firm
- Northern Services Inc.
- Fort Peck Assiniboine and Sioux Tribes

TOURISM:

- Missouri River Country
- Fort Peck Paleontology, Inc. and Dinosaur Field Station
- Fort Buford State Historic Site
- Montana Fish, Wildlife and Parks, Region 6
- Montana Promotion Division, Montana Department of Commerce
- McKenzie County Tourism Bureau
- Sherwood Inn
- U.S. Army Corps of Engineers, Fort Peck Lake Office
- Culbertson Visitors Center
- Fort Union Trading Post National Historic Site
- Judith River Dinosaur Institute
- Paleo World Research Foundation
- Fort Peck Interpretive Center and Museum

TRANSPORTATION/TRUCKING:

- BNSF Economic Development
- Livingston International, Inc.
- Yankee Group of Companies
- Canadian Freightways
- Ports-to-Plains Trade Corridor
- Prudhomme Trucks Ltd.
- Steve Nelson Trucking Inc.
- Panhandle Area Development
- Texas Motor Transportation Association
- Midwest Motor Express, Inc
- North Dakota Trade Office
- Diamond B Oilfield Trucking
- North Dakota Department of Transportation, Planning and Programming
- Yellowstone Valley Rail Road
- Bob's Pickup & Delivery, Inc.

OTHERS:

- Great Northern Development Corp.
- Dry Prairie Rural Water
- Montana Manufacturing Extension Center
- Montana World Trade Center
- Bear Paw Development
- S. Central Saskatchewan Transportation Planning Committee
- Regina Regional Economic Development Authority (RREDA)
- Sidney Millwork Company
- Montana Department of Commerce

OTHERS (Continued):

- Richland Economic Development Corporation
- Williston Convention and Visitors Bureau
- Glasgow Chamber of Commerce
- Valley County
- Culbertson Town
- The University of Montana, Bureau of Business and Economic Research
- Province of Saskatchewan Regional and Economic Co-operative Development
- Cover-All Building Systems Montana
- Dawson County Economic Development Council

1.2 Definition of the Study Area

The analysis of existing opportunities is conducted at three levels:[1]

- Locally, the study area is comprised of the Montana portion of the Theodore Roosevelt Expressway including MT 16 from the Port of Raymond in the north, south to Culbertson and US 2 east from Culbertson to the North Dakota state line.

- At a regional level the analysis broadens to include areas outside the immediate corridor area, including central and western Montana but also the Province of Saskatchewan and the States of North Dakota and South Dakota. The wider scope taken at this level is driven by the importance the MT 16/US 2 corridor provides to regional connectivity and mobility. Within this broader region the analysis notes the impacts that major metropolitan areas such as: Great Falls and Billings in Montana, Rapid City in South Dakota, and Saskatoon and Regina in Saskatchewan can have on the economy and traffic of the corridor area.

- On a national scale, the study area encompasses the entire northwestern region of the United States and the southwest portion of Canada bordering Montana and North Dakota as well as the central plains states including the entire Great Plains International Trade Corridor. In particular, travel and freight opportunities from Texas to Saskatchewan, Canada and from the West Coast to Minneapolis, Minnesota and the agriculture and industrial agglomerations beyond it need to be taken into account.

[1] See Working Paper 1 "Assessment of Existing Conditions" for more details and maps.

2: AGRICULTURE OPPORTUNITIES

The agriculture sector[2] plays a large role in the study area, accounting for about one fifth of total employment in 2000; agriculture is significantly more concentrated in this area than in the state as a whole.[3] Montana's most heavily produced agricultural crops include wheat, barley, oats, and sugar beets, and the study area accounts for a large amount of the state's total production of these crops. There are also several specialty crops in the study area which have seen a large increase in production over the past 5 years, including flaxseed, lentils, and peas.

2.1 Existing Opportunities

Eastern Montana has considerable potential for growth in the agriculture sector. The region's large acreage and sparse population allows for large amounts of land to be devoted to agricultural pursuits. Moreover, the relative size of the agricultural sector within the study area makes growth in the agriculture industry a primary potential for economic growth in the region.

2.1.1 Agriculture

There are various agricultural opportunities in the study area, at all three levels of analysis (local, regional, and national). Increases in crop production are expected, and irrigation projects to increase the acreage of plantable crop land have been proposed.

2.1.1.1 Local Level

In the state and in the study area, the number of farms and the land they cover has been steadily increasing. Recent trends in the study area show increases in harvested crops of wheat, oats, and sugar beets, in the production of specialty crops, in organic products produced, and in the cattle sector.[4] Furthermore, from interviews with agricultural contacts, it was learned that approximately 25 percent of the total farm acreage within the region is in the Conservation Reserve Program (CRP). Acreage designated by the Federal Government as being within the CRP cannot be farmed; instead producers are paid a stipend not to plant crops on those acres in an effort to diminish agricultural output and thus push up market prices. This means that if significant opportunities arose to generate more income from farming than from the government payments not to farm, then a large potential amount of land could go into production.

[2] Employment for agriculture is reported together with forestry, fishing and hunting, and mining within the census data; however, there is little to no forestry or mining within the study area.
[3] See Working Paper 1 "Assessment of Existing Conditions" for more details and supporting data.
[4] National Agricultural Statistics Service, United States Department of Agriculture; retrieved from http://www.nass.usda.gov/

Another area for potential growth has been in the production of pulse crops[5] in the study area. Respondents reported that since pulse crops hold moisture within the soil and add nitrogen back into the soil, production of these crops has been an attractive option to a fallow field. Because pulse crops can be planted in lieu of a fallow field within a normal crop rotation, they turn over land that had no crop planted on it before to the growing of peas and lentils. This gives a farmer a marketable crop where before they had none, and the crop planted after a pulse crop requires less nitrogen fertilizer, saving the producer money on crop inputs.

There is also potential for the development of processing facilities. For example, there are enough onion growers in the study area to make the development of a vegetable processing plant possible. In addition, economic development informants believe that if one more dairy operation is put in place in Sidney, there will be enough critical mass to develop a milk reduction facility. However, they report that without some assurance that value-added processing will be available, producers will be skeptical to change production; developing a processing facility requires a commitment for the acres of cropland it will serve.

2.1.1.2 Regional Level

Development of irrigation projects has been of interest in eastern Montana. Adding irrigated land can increase the acreage that can be planted as well as the value per acre planted as compared to dry acreage. One specific irrigation project that would provide for great economic opportunities in the region is on the Fort Peck reservation.

Conversations with representatives within the Fort Peck tribe suggest that the tribes could increase irrigation of their crop land. The tribe reports it was granted water rights to divert up to approximately 1,000,000 acre feet of water per year from the Missouri river. If this amount of water was actually diverted it would create the possibility of irrigating up to 450,000 acres of cropland. One limitation to the magnitude of this irrigation project is the number of acres of tribal-owned land suitable for crop production. With water values at $200 per acre foot, the tribe could potentially earn $200,000,000 per year, if they were able to fully utilize such water rights.

2.1.1.3 National Level

With health concerns growing in America, there has been increasing consumer interest in organic products and healthier oils. Due to these increasing health concerns, continued growth in this sector is expected nationally. The study area is home to much of the organic

[5] Pulse crops within the study area comprise mostly peas and lentils and other legumes; these crops have an ability to add nitrogen back into the soil instead of consuming it like most other crops.

crop production in Montana. As far as healthy oils are concerned, research has shown that Montola safflowers produce oil that is high in oleic acid and low in saturated fat[6]; correspondingly, safflower oil has been shown to be one of the healthiest oils currently available, healthier even than olive oil. Thus, there will likely be desire to increase the production of safflower oil, increasing the demand from agriculture for safflower seeds.

Montola Growers Inc., which has a seed crushing facility in Culbertson, reports exclusive rights to the Montola 2000 and 2001 seed varieties. These seed varieties (developed at Montana State University's Agricultural Research Center) are the varieties used to produce safflower oil. With organic products and safflower oil production concentrated in the study area, there is potential for growth in the agriculture sector to find a market at the national level.

2.1.2 Agriculture Based Energy

Agriculture and energy are highly interdependent, with some energy developments relying on growth in specific crops. For example, biodiesel, a relatively clean-burning diesel fuel, is made from renewable vegetable oil, such as soybean oil and safflower oil. The nation's safflower production is mainly concentrated in California, Montana, and North Dakota. Biodiesel production, in turn, generates outputs that can be used for livestock feed, suggesting greater local fattening and finishing within the area.

2.1.2.1 Local Level

With the safflower being a specialty crop in Montana, specifically in the study area, and with the recent interest in natural energy sources, there will most likely be increased demand for production of this crop. This trend presents an economic opportunity for growth in the study area.

The growing interest in biodiesel production has also spurred talks of growing camelina seed in the Fort Peck area. The Fort Peck area has long produced canola for cooking oil, but the camelina seed is a better producer of oil for the development of biodiesel. However, there are some difficulties in growing camelina, and the area is not equipped to mass produce this seed crop (the ground needs to be specially prepared, the harvesting of the crop is different than the harvesting of canola, and special equipment is needed to efficiently handle this crop). Thus, before mass production of camelina would be viable, substantial commitment to biodiesel development would be necessary.

[6] See http://www.montola.com/why_oil.html

Ethanol is another potential natural resource for development in Montana. In the United States, ethanol is derived mainly from corn grain; however, ethanol can be derived from most agricultural crops. With the concentrated agricultural production within the study area, ethanol development is possible.

An additional advantage of using ethanol as an energy source is that animal feed grain is a byproduct of the alcohol extraction process.

This feed grain could be used to provide another source of local livestock food supply, which could create an incentive to lengthen livestock feeding.

2.1.2.2 Regional Level

On a regional level, building biodiesel plants in Montana would provide opportunities for trade with Canada. Developing biodiesel facilities requires an adequate amount of seed to crush. This seed, specifically canola, could be imported from Canada.

2.2 Impediments to Growth

Because the agriculture industry is highly dependent on transportation, respondents noted that the full extent of agriculture opportunities may not be realized without road improvements. The transportation system is a necessary means through which commodities such as grains and livestock are distributed from the production points within Montana to final markets outside of the state.

Individuals surveyed in the area reported that transportation infrastructure is a major impediment to growth in the agriculture sector. (About two-thirds of those surveyed felt that access or quality was an impediment to growth in agriculture.) In general, farmers are required to truck products from fields to rail loading facilities in order to get their output to final market. With the trend towards consolidating loading facilities and the movement towards using 110-car shuttle facilities, adequate road infrastructure would help mitigate transport risks associated with moving products to market. This would occur because better roadways would allow some farmers to transport to more distant, lower-rate loading facilities instead of the most local one.

Improved highway infrastructure is, by this view, critical for the development of local value-added agriculture industries since final products must be shipped out of the region to final consumer markets.

Other obstacles to growth in the agriculture industry are high rail rates and the trend towards increasing consolidation of rail-loading facilities. About half of respondents in this area believe that high rail rates or lack of access to rail are among the main impediments to growth. Adequate roadway infrastructure would mitigate these problems by increasing the speed and safety of long distance trucking to more distant loading facilities.

The increase in larger 110-car loading facilities and their corresponding lower shipping rates per carload have led to the closing of smaller capacity loading facilities, and this trend appears to be continuing. The consolidation of rail-loading facilities will make it more expensive for farmers to truck their products to the closest facility. Continued evidence of this trend is seen in the Columbia Barge Company's reported purchase of land in Culbertson, potentially for another 110 car loading facility.

Finally, the lack of adequate water supply in Montana, and specifically in northeastern Montana, poses a potential obstacle. An ample supply of water is necessary for the proposed irrigation projects.

2.3 Opportunities Arising from Road Expansion

Roadway improvements would lower transportation costs, increase farmers' potential profitability in their crops, and encourage value-added agriculture. Improved transportation could allow for increased crop production, as the subsequent reduced transport costs would allow more farm acreage[7] to go into production profitably.

Finally, road expansion would provide increased ease of transport for agricultural contract trucking firms and improve the timeliness of deliveries. Improvement of roadways along the corridor would facilitate the on-time delivery of needed supplies, such as replacement machinery parts for producers, thus generating a potential cost savings.

2.4 Summary of Findings

This section provides a summary of the major opportunities within the agriculture sector in the region, factors impeding growth, and potential agriculture opportunities that may benefit from roadway improvements in the study corridor.

[7] As profitability in agriculture rises, eventually it could be more profitable to farm the land directly than accept the government payments to keep land on the CRP, thus overall planted acreage could increase. Profitability increases also create the incentive to shift land into agricultural production that currently is not considered agricultural land.

Summary of Opportunities Identified in the Agriculture Sector:

- Pulse crops can be planted in fallow crop rotation, thus increasing bushels produced and demand for agricultural trucking. The planting of pulse crops has the added benefit of adding nitrogen to the soil.
- Potential to build several processing facilities (i.e. vegetable processing plants) and a milk reduction facility.
- Development of irrigation projects.
- Increase in the production of organic crops and safflower oil as a result of consumer preferences shifting towards healthier oils.
- Increase in the production of safflower seed to fuel bio-diesel plants.
- Possibility of growing camelina seed in the Fort Peck area for use in maintaining bio-diesel plants.
- Growth in imports from Canada (specifically canola) to have adequate seed to crush for maintenance of bio-diesel plants.
- Increase in cattle numbers as a result of increased feed grain from ethanol byproduct.

Summary of Impediments to Growth in the Agriculture Sector (percentage of all respondents citing factor as an impediment):

- Transportation infrastructure access or quality 68%
- High rail rates or lack of access to rail 52%
- High fuel or other input prices 44%

Summary of Impacts of Infrastructure Improvements in the Corridor:

- Increased ease of transport for agricultural contract trucking firms and overall lower vehicle operating costs, leading to lower costs and increased profits for producers.
- Better highway infrastructure would support the development of local value-added agriculture industries because inputs to such industries come in by truck from rural farms, and the final products must be trucked to distribution or processing centers enroute to final consumer markets.
- An improved road corridor would help with the on-time delivery of needed supplies, such as replacement machinery parts, for producers.

3: ENERGY OPPORTUNITIES

Montana has vast opportunities for energy development. The state is rich in natural resources and has renewable energy potential. Specifically, Montana has considerable oil production capabilities. It also has a large potential supply of clean energy from sources such as biodiesel, ethanol, and wind power.

3.1 Existing Opportunities

With the recent renewed interest in developing Montana's natural resources and with the price of crude oil rising, opportunities for growth in the energy sector within the study area are arising, respondents report Several energy-related projects in the study area using Montana's natural resources have already been proposed. Oil exploration activities have also been of particular interest recently.

3.1.1 Local Level

Northeastern Montana is the largest oil exploration area in Montana. A substantial share of oil production is concentrated in the study area, primarily in Richland, Roosevelt, and Sheridan Counties. Between 2000 and 2005, oil production expanded rapidly in northeastern Montana, particularly in the study area. In fact, production in Richland County increased almost four hundred percent between 2000 and 2004. With crude oil prices rising, exploration activities have greatly increased.[8]

Representatives from the oil and gas industry explain that CO_2 can be used in oil extraction activities to make the process more efficient. Typically, water is used in order to extract the oil, but this leaves about 70% of the oil still in the ground. Using CO_2 after this initial extraction phase can greatly increase yields, reducing the amount of oil that is left in the ground to 30-40%. While using CO_2 to extract oil within the study area would be valuable, it is not likely that this CO_2 would be trucked to the area because of the corrosive nature of CO_2 in liquefied form. Instead, it would most likely be necessary to pipeline it short distances.[9]

In addition to oil, Montana has vast reserves of other valuable energy resources. Montana has the largest coal reserves in the United States and the 5th largest wind resources. As of 2003, the state was the 6th largest producer of coal, the 8th and 10th largest driller of oil and natural gas wells, respectively, and the 13th largest installer of wind energy capacity.

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[8] See http://www.gasandoil.com/goc/news/ntn53526.htm

[9] Experts within the oil and gas industry have stated that a pipeline will only be feasible to transport CO_2 from coal conversion plants or coal electricity generating plants within a 100 mile radius of the oil field destination because of the harshness of the liquid form of CO_2 on the metal in the pipeline.

Overall, 94 percent of the state oil production, 36 percent of the state natural gas production, and 67 percent of the state oil and gas production tax occurs in eastern Montana. Fifty-four percent of the State oil production, 10 percent of the State natural gas production, and 25 percent of the State oil and gas production tax (totaling $16.5 million) is concentrated in Richland County.

Technology is currently available to turn coal into clean-burning diesel and aviation fuel through the Fischer-Tropsch process.[10] This technology has not been widely adopted largely because producing synthetic fuels from coal and natural gas is not profitable when oil prices are below $30 a barrel; however, with current oil prices over $60 a barrel, there has been renewed interest in the technology. Furthermore, since many of the impurities are removed during the process, fuels produced using the Fischer-Tropsch process are cleaner than petroleum-based fuels. The possibility of building Fischer-Tropsch plants would generate substantial economic opportunities in the region.[11] However, there has been skepticism regarding whether enough water is available in eastern Montana to run a substantial number of these plants.[12]

Because of the recent renewed interest in developing Montana's natural resources, four energy related projects have been proposed within the study area: the Valley County Wind Energy Project, the Nelson Creek Project (a coal project near Circle), the Montola/Sustainable System Project (a bio-diesel refinery in Roosevelt County), and the Yellowstone Ethanol LLC Power Plant.[13]

- The Valley County Wind Energy Project (a.k.a. Wind Hunter Project) could generate up to 500 MW of wind energy using 334 wind turbines with a 30-mile 230 kV transmission line. The construction would take place in three phases, beginning in 2008 and ending in 2016. The economic benefits to the region begin with construction (approximately 618 full-time equivalent (FTE) positions will be required); an estimated 89 FTE permanent jobs will also be created involving the operation and maintenance of the Valley County Wind Energy Project.

[10] This technology was developed in war-time Germany because it had reserves of coal but lacked petroleum. Sasol, a South African company, has been producing synthetic fuel from coal since 1995.

[11] See *Coal Rush*, Missoula Independent, Vol. 17, No. 15, April 2006. http://www.missoulanews.com/News/News.asp?no=5158

[12] See *Coal Made the Headlines, but the Real Story of the Energy Summit was the Cost-Effectiveness of Renewable Energy*, Billing Outpost, October 2005, http://www.aeromt.org/wilbur%202.php

[13] See The Montana Symposium: Energy Future of the West. Montana's Energy Symposium, October 2005; retrieved from: http://www.energyfuture.mt.gov; http://sidneyherald.com/articles/2006/07/09/news/news03.txt

- The Nelson Creek Project is a proposed lignite-fired power plant that would be built near Circle, Montana. This clean coal mine-mouth power plant could provide 500 MW of electrical power. The construction would bring many temporary employment opportunities to the area; as many as 1,200 people would be needed during the construction period. Furthermore, 150 permanent FTE positions would be needed to operate the project after construction is complete and these jobs will be of high quality, having an average wage of $60,000 per year.

- The Montola/Sustainable Systems Project involves building a biodiesel refinery near Culbertson in Roosevelt County, Montana. If developed, estimates suggest the facility would produce 15-20 million gallons of seed-oil per year. This plant would enhance the economy by providing permanent work to 31 FTE positions with an expected average wage of $14 per hour. This facility would also likely require imports from Canada in order to have adequate seed to crush, which would potentially increase truck traffic in the study area.

- The Yellowstone Ethanol LLC Power Plant is a 50-million-gallon-per-year ethanol plant (with the potential to produce up to 100 million gallons per year in future) to be built in North Dakota between Williston and Fairview. It is projected that the plant would cost $120 million and would generate 400 construction jobs resulting in $6 million in construction wages during the building phase and 40 permanent jobs with an annual payroll in excess of $1.5 million. Furthermore, 18-20 million bushels of corn and up to 2 million bushels of barley or wheat would be needed per year to sustain the plant. The pulp byproduct from the plant would feed 250,000 feeder cattle.

Some other potential energy projects suggested by respondents in the study area include an ethanol production plant in Oswego (Valley County), an oil refinery outside of Culbertson, and re-establishing an old oil refinery at the intersection of US 2 and MT 13, just west of Wolf Point. Furthermore, there are reported plans to build three or four additional ethanol plants in the state in the next few years.

3.1.2 Regional Level

With the increase in oil production and exploration in Montana, there are many opportunities for trade on a regional level.

It is likely that there will be increased truck traffic as oil exploration and extraction activities continue. Due to limited pipeline infrastructure for the transportation of oil, trucking has been the only option for many producers exporting oil to Canada. Also, the increased demand for oil exploration has the potential to bring jobs to the region.

3.1.3 National Level

With the proposed energy developments and increased oil exploration, there are many opportunities for exporting energy on a national level. For example, recently Montana has been exporting a large share of its oil production to Wyoming for refining. A wind plant in Valley County would bring further opportunities to export energy by selling wind-generated electricity on the national electric grid.

Alberta, Canada has also recently seen substantial economic growth as a result of oil & gas and oil sands projects. In fact, such projects account for the majority of economic growth in the Alberta region. Even though this activity is taking place far from the Montana section of the TRE, it still could have traffic effects along the corridor because of the potential for large future growth within the Alberta energy sector.

3.2 Impediments to Growth

An obstacle to Montana oil sellers is the limited infrastructure for transporting oil to refineries. Of those respondents surveyed, more than two-thirds feel that transportation infrastructure capacity or quality is an impediment to growth in the energy sector. Currently, the existing pipelines are to capacity with Canadian crude, since Canadian suppliers had purchased rights to a large amount of the pipeline capacity. Subsequently, as a result of the limited pipeline capacity, Montana producers have trucked their oil to refineries instead, and offering their oil at discounted prices to make it attractive to refineries that might otherwise use the more convenient Canadian crude. (Since Canadian producers have purchased pipeline capacity rights to US pipelines, they are able to sell at a substantially higher price than Montana oil producers.)[14]

Recently, there have been discussions of the need for better oil infrastructure. Montana is among the top ten oil-producing states and has had the largest increase in oil production of any state in the US, primarily as a result of extensive exploration efforts. Additionally, the discovery of oil in the Williston Basin has allowed for significant increases in oil production and given Montana and North Dakota great potential for oil production in the future.[15]

Economists, including Paul Polzin of the University of Montana's Bureau of Business and Economic Research, expect that high oil prices will continue for some time, so the strength of oil as an economic potential is seen as a major growth sector for the study area. Oil exploration and extraction activities will likely increase truck traffic. This will be especially prominent in the study area, as much of this activity has been in Richland County. However, for this exploration to reach its full potential as a localized industry, there is a need for increased labor and housing. Of those surveyed, over a third of respondents felt that lack of labor supply was an impediment to growth in the energy sector.

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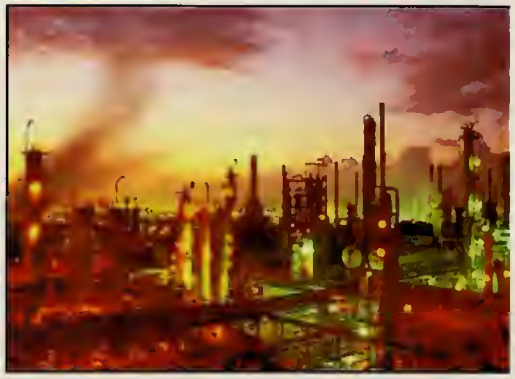
[14] See *Governors to Discuss Need for Better Oil Infrastructure*, The Associated Press, April 2006, http://www.helenair.com/articles/2006/04/18/montana/08mt20060418001.txt

[15] See *Some Interesting Oil Industry Statistics*, Gibson Consulting Online, http://www.gravmag.com oil.html

Developing an oil refinery in the study area could have a beneficial effect on the local economy by allowing for a shorter haul to a refining facility and saving a significant value of crude product. The development of oil in Montana, as well as in Saskatchewan and Alberta, could give this region new centrality as an impetus to added refining capacity. However, this opportunity may be fleeting, as "first movers" are likely to restore equilibrium in the spatial scheme of refining and distribution.



Finally, as discussed previously, the lack of water supply in eastern Montana is likely to be a factor affecting the feasibility of some of the proposed energy projects. Facilities such as those that convert coal to fuel require substantial supplies of water. Water has been one of the major issues thwarting coal development in the region.[16]

3.3 Opportunities Arising from Road Expansion

Roadway improvements would give rise to various opportunities in the energy sector. Maintaining some of the proposed energy plants could require imports from Canada; an enhanced corridor would make the transport of inputs from Canada even more appealing. Roadway improvements would increase the possibility of north-south truck transport.

The oil and gas sector is highly reliant on transportation in the movement of inputs, labor, and outputs. With the lack of adequate pipeline capacity to ship oil and gas in the region, trucking is a necessary means of transporting oil to refineries; at least until more efficient pipeline capacity is added. Without improvements to roadway infrastructure, growth in the oil and gas sector will not reach its full potential in the near term.

Road expansion would likely enhance oil exploration activity in the study area. Improvements to the roadway would increase the availability of labor in the area by making it easier for workers to commute to work across longer distances. Because of the noted shortage of energy sector labor, workers from surrounding major cities could be required to fulfill the demand for oil exploration activities in the area. Lacking sufficient local agglomeration in the industry, however, much of the needed labor may come from regional and national markets.

Finally, an enhanced corridor could lead to higher population in the area, due to the induced economic development, increasing regional demand for electricity and prompting various other energy projects.

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[16] See *Coal Made the Headlines, but the Real Story of the Energy Summit was the Cost-Effectiveness of Renewable Energy*, Billing Outpost, October 2005, http://www.aeromt.org/wilbur%202.php

3.4 Summary of Findings

This section provides a summary of the major opportunities within the energy sector in the region. In addition, the main impediments to growth and energy opportunities arising from roadway improvements in the study corridor are discussed.

Summary of Opportunities Identified in the Energy Sector:

- Increased oil exploration opportunities.
- Talks of building an oil refinery outside of Culbertson and the possibility of re-establishing an old oil refinery near Wolf Point.
- The economic feasibility of building Fischer-Tropsch plants to process coal into liquid fuel.
- Several energy related projects have already been proposed in the study area, such as the Valley County Wind Energy Project, the Nelson Creek Project, Montola/Sustainable Systems Project, and the Yellowstone Ethanol LLC Power Plant.
- Potential to build several other ethanol production plants and biodiesel refineries.

Summary of Impediments to Growth in the Energy Sector (percentage of all respondents citing factor as an impediment):

- Transportation infrastructure capacity or quality[17] 67%
- Lack of labor supply 43%
- Lack of housing 19%

Summary of Impacts of Infrastructure Improvements in the Corridor:

- An enhanced corridor, as part of the Great Plains International Trade Corridor, can provide improved access to Denver and Midwestern and Southwestern markets.
- Improved transportation infrastructure is needed to keep up with the growth of the energy sector in the region, thus growth in this sector could be held back if the corridor is not expanded.
- Combined with other factors, an enhanced corridor could lead to higher population in the area by making the area more attractive to businesses and increasing economic development in the area. This could, in turn, increase the regional demand for electrical energy.

[17] In general, transportation infrastructure for the energy sector includes roadways, rail lines, and pipelines.

- The remoteness of the study area makes dependable highway capacity and quality critical to facilitate the attraction and utilization of an adequate labor supply.

4: TOURISM OPPORTUNITIES

Since the late 1980's, tourism's role in the Montana economy has been growing. Tourism can raise income and tax revenue for the state through visitor spending and increase employment opportunities. The tourism industry relies on an efficient and safe transportation network.

4.1 Existing Opportunities

Although the number of visitors to Fort Peck Lake is substantially less than that of the top two Montana tourist destinations, Glacier National Park and Yellowstone National Park, Fort Peck Lake is still one of the top five tourist destinations in Montana. Fort Peck Lake is such a popular attraction to the area because of the diverse array of activities offered, such as fishing, boating, dinosaur excavation, and wildlife viewing. There are also a variety of seasonal activities, such as the Ice Fishing Derby in February and the boat launches in the summer, which always attract large numbers. Not surprisingly, development of the tourism industry in the study area could be substantially beneficial to the local economy. If plans of developing attractions in the area come to fruition, this could increase annual visitation and overnight stays, resulting in more tourism dollars for the area's economy.

There are several other developments currently underway and other projects still in the planning stages to improve tourism in the study area. For example, work is still continuing to fully develop the museums and dig sites which make up the Dinosaur Trail. The Montana Cowboy Hall of Fame is currently under development and is designated to be built along US 2 in Wolf Point. Also, infrastructure improvements that might bring visitors to the study area include a convention center to attract business groups.

Additionally, more information kiosks at rest stops and more frequent rest areas in general may make tourists more comfortable traveling along the study corridor, thus increasing potential visitation to the area.

4.2 Impediments to Growth

Respondents report that highway safety is a factor that adversely affects tourism growth in the area, especially among families. Because of the remoteness of the area, it is necessary to travel on narrow, two-lane roads to visit tourist destinations, which can be unattractive to out-of-area visitors. The difficulty of passing other vehicles makes traveling along a two-lane corridor more hazardous than a four-lane highway, and Montana's different speed limits for

cars and trucks (see Table 2) poses a further safety hazard. These issues all enter potential tourists' minds when they decide where to visit.

Table 2: Speed Limits for Montana, in miles per hour

Type of Highway	Cars and Light Trucks		Heavy Trucks*	
	Daytime	Nighttime	Daytime	Nighttime
Interstate	75	75	65	65
Interstate Within Urban Area Billings, Great Falls and Missoula	65	65	65	65
Two-Lane	70	65	60	55
U.S. 93	65	65	60	55

Source: Montana Department of Transportation
** Over one ton manufacturer's rated capacity*

Safety concerns also arise with high percentages of truck traffic. With the possible economic expansion in the agriculture industry, truck traffic in the study area will increase. Considering the wide and oversized loads commonly associated with the movement of agriculture equipment, safety issues are likely to be a concern among tourists. Thus, in order not to have a reduction in the current level of tourism in the region, roadway enhancements may become necessary along MT 16 and US 2.

Tourism contacts surveyed within the area stated that there is inadequate signage for tourists and a general lack of advertising in the region. The reasons cited for the lack of signage were regulations limiting sign placement (signs are only allowed to be placed along the primary roadway for a destination) and that signage placement and upkeep costs can be prohibitive, especially along remote sections of roadways. Some survey participants believed that erecting signs on some of the major routes tourists are likely to travel may lead to higher visitorship of tourist attractions located on less major roadways, and an increase in advertising may attract visitors from outside of the region to less well known tourist attractions.

It has been suggested by some stakeholders within the region that some travel organizations have been recommending routes that do not contain US 2 even when it would be the most direct route. This is believed to be due to specific trip-routing software algorithms that are intended to generate routes that are the shortest in travel time. Such software often routes long distance trips along interstates rather than US 2 route, because while US 2 may offer a shorter route, it also has lower levels of service and lower speed limits than the interstates.

The resulting reduction in drive-by traffic contributes to a lower visitorship for tourist destinations along US 2 .

Finally, the area's long distances from major population centers makes it unlikely that future highway expansions will affect travel behaviors in a significant way: travel time savings or safety improvements (from future expansions) will remain small relative to overall travel costs. Since no amount of highway improvements will change the area's remoteness, this factor is likely to remain an impediment to growth in the tourism sector.

4.3 Opportunities Arising from Road Expansion

Roadway improvements in the study area could potentially attract visitors to the region, because tourists tend to be reluctant to drive on narrow, two-lane roads that make passing more difficult. Expanding the roadway would also increase safety in the region. Highway expansion would mitigate the problems arising from the variation in speed between trucks and cars, as vehicles traveling at different speeds would be able to travel in separate lanes. Of those tourism contacts surveyed, almost half cited transportation infrastructure capacity or quality as one of the main impediments to growth in tourism. Thus there seems to be anecdotal evidence that enhancing the roadway would directly increase tourism within the region.

4.4 Summary of Findings

This section provides a summary of the major opportunities within the tourism sector, obstacles to growth in this industry, and general opportunities arising from roadway improvements in the study corridor.

Summary of Opportunities Identified in the Tourism Sector:

- Plans of developing a destination resort in the Fort Peck area.
- Continued enhancements to the Dinosaur Trail.
- Increased signage and advertising.
- Plans to develop Montana's Cowboy Hall of Fame.

Summary of Impediments to Growth in the Tourism Sector (percentage of all respondents citing factor as an impediment):

- High fuel prices 63%
- Transportation infrastructure capacity or quality 46%
- Lack of advertising 25%
- Lack of labor supply 8%

Summary of Impacts of Infrastructure Improvements in the Corridor:

- Enhanced roads may make the tourist destinations in the region more attractive to out-of-area visitors.
- The difficulty in passing vehicles makes traveling along a two-lane corridor more hazardous than a four-lane highway.

5: TRANSPORTATION OPPORTUNTIES

Given the remoteness of the study area from major population centers within the United States, transportation becomes a critical factor for economic growth in the region. For industries that are located within the area, adequate transportation is necessary to receive inputs and also to transport finished products to market. For a business analyzing possible relocation to the area, a primary concern is the quality of the highway network. Interview responses suggest that many potential firms believe it is too risky to relocate to an area without close access to a four-lane highway. Inadequate roadway infrastructure further makes locating a business in the area particularly difficult because of the hardships to labor of commuting to work over long distances. And since there are no large concentrations of population within the study area, labor would necessarily need to be drawn over a large geographical area.

5.1 Existing Opportunities

The study corridor provides regional connectivity with North Dakota and Saskatchewan, and this is important when assessing economic opportunities in the area.

5.1.1 Local Level

On a local level, interview respondents suggest that highway enhancements would make businesses more likely to locate in the study area. This would increase traffic on the road, both by increasing trucking opportunities and by increasing the number of individuals driving through the study area to get to work. The work-related traffic is due to the study area's location in a remote rural area of Montana, which makes it necessary to draw labor from surrounding areas.

5.1.2 Regional Level

Trucks traveling across the US-Canada border in the study area have the option of crossing through the Port of Raymond, in northeastern Montana, or the Port of Portal, in northwestern North Dakota. There could be time incentives for trucks to cross at the Port of Raymond rather than at the Port of Portal due to higher potential processing delays at the Port of Portal. However, the distance is greater using Raymond for transport to Midwestern urban centers such as Chicago, Minneapolis, and Kansas City than using the Port of Portal. But if cross-border trucking increases, over time, delays at the Port of Portal could intensify and make truckers more likely to choose to cross at the Port of Raymond. Shortest distance is the primary factor in route selection, making the Port of Portal the dominant route choice to eastern destinations. Both ports are 24 hour ports of entry for both autos and trucks.[18]

[18] Source: U.S. Customs and Border Protection

In general, growth in US-Canadian border crossings has been around 3-10 percent per year. As long as the Canadian dollar remains strong against the American dollar, this growth is expected to continue. Thus, because of the increase in border-crossing demand, there is potential for trucks to utilize the study corridor in north-south freight movements. Another trend worth noting is the significant increase in oil and gas trucks crossing the border in the past 8 months, due in large part to the fact that diesel is currently much cheaper in the US than in Canada (by at least $1/gallon).[19]

5.1.3 National Level

The absence of sufficient north-south rail lines means that railroads cannot adequately service rail freight movement in this direction. Historically, the rail line was laid primarily east to west, reflecting the majority of freight movement, a pattern which resulted in the current lack of north-south rail. With the emergence of the North American Free Trade Agreement (NAFTA), there has been growth in the demand for north-south freight movement. Informants suggest that rail will not be able to adequately serve the increased north-south freight movements, thus leading to increased truck traffic. There is also further potential growth in north-south freight because of the linkage between oil producing regions of Texas and Oklahoma and Alberta and Saskatchewan. The oil industry infrastructure needed to expand the Canadian oil fields is located in the southern Midwest of the United States, and a direct north-south route would lead generally through the TRED corridor region.

5.1.4 Regional and National Corridor Improvement Outlook

In an effort to examine the regional ramifications of an expansion of the TRED corridor, MDT conducted an informational survey of the transportation agencies of Saskatchewan, North Dakota, South Dakota, Idaho, Washington, Colorado, Texas, Nebraska, Minnesota, and Oklahoma. This survey's purpose was to determine the likelihood that sections of roadways that connect with the Montana TRED corridor, that exist within these other jurisdictions, would be expanded. The survey also asked whether the expansion of the Montana section of the TRED corridor would increase the likelihood of expansion of connecting sections of roadways within these other jurisdictions.

Of the nine states and one province surveyed, seven responded; North Dakota, South Dakota, Saskatchewan, Idaho, Minnesota, Nebraska, and Texas. Of those that responded, five; North Dakota, South Dakota, Idaho, Texas, and Nebraska indicated that over the next 20 years they have plans to widen sections of roadways that interconnect (either directly or indirectly) with the Montana TRED corridor.

On the question of whether the expansion of the Montana section of the TRED corridor would have any impact on the likelihood of expansion within the survey respondents'

[19] Meetings with US Customs and Border Protection

jurisdictions, only one, North Dakota, indicated it would have any significant impact on their expansion decisions. North Dakota responded that if the US 2 section of the Montana TRED corridor were widened, they believe there is a high probability that the North Dakota US 2 section from the Montana border to US 85 west of Williston would be expanded.

5.2 Impediments to Growth

One of the major impediments to growth in the transportation sector is a lack of labor supply. The current and predicted lack of drivers is a national problem, and within the study area it is magnified by the remote location and lack of ability to find suitable labor. More than a third of transportation contacts surveyed reported that inadequate labor supply was an impediment to growth in the transportation sector.

Different standards for bridge length rules could also be an impediment to growth in cross-border trucking. The Truck Size and Weight (TS&W) regulations are rather complex and there is wide variation in limits, not only between the US and Canada, but also among states in the US and among provinces in Canada. The inconsistencies in truck regulations can add to the cost of cross-border truck movements both in terms of time and money. For example, many trucking firms have separate truck fleets for domestic shipments and for cross-border shipments. In addition, the difference between regulations within the US and within Canada necessitates additional truck inspections to ensure that provincial or state regulations are not being violated. The western Border States (except for Minnesota) are currently allowed 14-foot high vehicles, whereas most western Canadian provinces only allow 9-foot high vehicles.

Due to the variations of truck size and weight regulations, trucks in the western US and Canada crossing international and state borders are required to: stretch or contract trucks, raise, lower, or reposition axles; reposition fifth wheels; add or remove tires; and shift or modify loads. For example, Canada's steering axle limit (5,500 kg) is more restrictive than that in the western Border States (6,000 kg). This requires truckers to move their fifth wheel when traveling into Canada in order to meet regulations. Also, the split tandems used for semi trailers in the western Border States are not allowed in western Canada. All of these factors make the standardization of TS&W regulations attractive to truckers, as regulatory harmonization could remove a multitude of costs.

Among the major impediments to harmonizing regulations are differences in infrastructure design, construction, and fleet designs within states and provinces. Also, since the majority of freight shipments are short movements and most commonly within a state or province, these problems have not drawn enough attention to demand change. Weight regulations do not seem to present a large obstacle to truckers traveling between the western Border States, as the majority of trucking is done at weight levels significantly below Gross Vehicle Weight (GVW) limits.[20] Among the western Border States, Montana has the highest GVW limit, at

[20] See *Western U.S. – Canada Cross Border Case Study*, US Department of Transportation Comprehensive Truck Size and Weight Study, Report number 5, December 1995

131,060 pounds for the majority of the state (between Shelby, MT and the Montana-Alberta border, the limit is raised to 137,500 pounds). Both North Dakota and Manitoba, Canada have more stringent GVW limits than Montana, at 105,500 pounds and 124,300 pounds, respectively.

Federal size and weight regulations are enforced on all routes included on the National Network. However, in Montana, only Interstate highways are on the National Network. By contrast, both North and South Dakota have some non-interstate routes that are parts of the National Network (including US 2 and US 85), ergo these routes are constrained by Federal Highway regulations. Thus, Montana has the flexibility to change truck standards on MT 16 and US 2, while North Dakota and South Dakota do not. This could potentially entice truckers from Canada to use MT 16 if Montana harmonized regulations on MT 16 down to Culbertson in accordance with Canadian configurations. However, Canadian regulations should also be changed to allow Montana sizes and weights.[21]

Another impediment to growth is related to the service hours at the Canadian ports of entry. Hours of operation for commercial traffic at the Port of Regway, opposite Raymond on the Canadian side, are limited to 8:00AM to 5:00PM, Monday through Friday (except holidays).[22] This limited service could constrain future growth in north-bound freight movements on the border at Raymond.[23]

A further negative impediment to traffic is due to the impact of US Department of Homeland Security initiatives post September 11, 2001 which disallow "in transit" moves through the USA. An "in transit" shipment is freight that is shipped from a foreign port to a foreign port but travels through sections of the United States to get to its destination. Canadian transportation experts have indicated that due to many Canadian shippers' preference for US east-west highways there was a significant volume of Canadian freight being shipped in this manner. These initiatives significantly reduced the use of US 2 east to west and west to east. Overturning this restriction or providing another method of securing this type of shipping such as GPS tracked seals on trailers would allow significantly increased transport activity through this corridor.

Finally, recent high fuel prices have been hurting the transportation sector and are likely to be an impediment to growth in the future. Almost a third of survey respondents from the transportation sector felt that high fuel prices would hinder future industry growth. This response seems to be because fuel prices are a substantial contributor to overall shipping costs which means that overall shipping costs will also go up. Furthermore, as shipping costs go up it should be expected that either overall demand for shipping services declines, or at

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[21] See *Estimating Traffic Changes and Pavement Impacts from Freight Truck Diversion Following Changes in Interstate Truck Weight Limits*, Humphreys and Fortowsky, January 2006, p. 75

[22] Source: Canada Border Services Agency, http://www.cbsa-asfc.gc.ca/contact/listing/offices/office616-e.html.

[23] North Portal, opposite Portal, on the other hand, operates 24 hours a day, 7 days a week. See Working Paper 1 for more details.

least the growth in demand for shipping services will grow at a slower pace than would have occurred had fuel prices not been high.

5.3 Opportunities Arising from Road Expansion

With roadway expansion, informants expect truck traffic to increase in the study area for several reasons. Traffic currently using nearby routes could be diverted from the less desirable, local ancillary roadways to an improved corridor. An improved roadway would minimize the "wear and tear" costs on vehicles passing through the corridor, lowering their costs and increasing profits for transportation companies. Also, improved conditions could entice truckers crossing the US-Canada border to ship through the Port of Raymond instead of the Port of Portal, especially if the time incentives to cross at the Port of Raymond increases.

Increased truck traffic in the region could, in turn, attract businesses to the area, such as additional truck stops, gas stations, and restaurants, amenities which could further increase truck traffic cumulatively. This would also lead to some population growth in the study area.

5.4 Summary of Findings

This section provides a summary of the major opportunities, impediments to growth, and the possibilities arising from roadway improvements within the transportation sector.

Summary of Opportunities Identified in the Transportation Sector:

- Recent trends in cross border trucking (3%-10%)
- As congestion increases at the Port of Portal due to overall increased cross-border trucking, time incentives for trucks crossing at the Port of Raymond may increase truck movement along the corridor.

Summary of Impediments to Growth in the Transportation Sector (percentage of all respondents citing factor as an impediment):

- Lack of labor supply 41%
- Transportation infrastructure capacity or quality 36%
- High fuel prices 32%
- Standardization of regulatory codes with other states and Canada 32%

Summary of Impacts of Infrastructure Improvements in the Corridor:

- Possible population growth due to the study area corridor enhancement would lead to higher demand for shipping and transportation services in the region.

- An improved corridor in the region would result in less "wear and tear" on vehicles using the route; increasing the bottom-line profits of transportation firms.
- An improved corridor will allow businesses to enjoy a lower cost of shipping and to draw labor from a broader area; enhancing the overall economic viability of the region.
- An improved corridor would lead to higher traffic on the expanded highway partly because traffic would be diverted from other less desirable, secondary local roadways. A four-lane road would further provide for improved level of service as compared to the existing two-lane corridor.

6: RETAIL TRADE AND OTHER OPPORTUNTIES

In addition to the agriculture, energy, tourism, and transportation sectors, there are various other existing economic development plans in the region. Of particular importance is the retail trade sector. This sector accounts for much of the State's total employment and for the largest percentage of expenditures by visitors to the region.

6.1 Opportunities in the Retail Sector

In Montana, the study area, and nationally, retail trade is the largest sector in number of establishments. In terms of employment, this sector has dropped to the second largest (after agriculture) since 1990.

The retail trade industry is highly dependent on visitors to the area. In fact, retail sales are the prime economic impact of tourism in the state.[24] Retail trade expansion opportunities could increase as growth in tourism increases.

6.2 Other Opportunities

There are additional (non-retail) economic opportunities in the study area, including the possibility of building a FedEx hub in Plentywood and the development of the Municipal and Rural Water Pipeline project.

For shipments destined for Canada, it is currently quicker for people in Plentywood to cross the border to send their packages than to send them from the United States, where they will take approximately 2 weeks to travel the 200 miles to Regina. Informants report that a FedEx hub in Plentywood would reduce the time it takes to ship packages via FedEx across the Canadian border.

The Municipal and Rural Water Pipeline project (MR&I) is a project designed to provide a high quality and safe drinking water supply in the area. Using the existing Culbertson water treatment plant, the communities of Froid and Medicine Lake were connected to the regional system last year. In 2006, the community of Bainville and surrounding rural hookups will be added to the system. On the Fort Peck Reservation, the Tribe has completed construction of a water intake and transmission line to the location of the systems central water treatment facility. The Tribe is in the process of bidding the construction of the treatment plant at this time. At completion, the Fort Peck / Dry Prairie Regional Water System will provide service to communities and rural farmsteads north of the Missouri River, to the Canadian Boarder and from the North Dakota state line west to a boundary that lies just west of Glasgow. Ground water in this region is poor and heavily mineralized. In some areas, nitrates have been measured above levels that are safe for human consumption. In other areas, oil

[24] For example, in Richland County, 48 percent of the $30 million spent by visitors in the region was spent in the retail trade sector (Regional Non-resident Spending in Montana. Institute for Recreation and Tourism Research, University of Montana, March 2000, Table 8.2, page 40.).

exploration activities have affected ground water quality. Through centralized treatment of Missouri River water, high-quality and safe drinking water will be supplied to the region. With the water comes increased possibility of growth, since good water is vital for development.

The widening of US 2 and MT 16 would allow for a variety of other economic developments in the study area. Some informants speculate that it would allow for the possibility of 2 or 3 additional duty-free providers on either side of the Port of Raymond. Also, they report, improvements to US 2 could lower freight rates since road quality and capacity directly affect the cost of transport over the corridor.

Enhancing the highway corridor could also improve the livability of the area by making it easier for people to travel to farther away cities with shopping and cultural amenities not existing within the local regions.

An improved corridor could provide various benefits for businesses, such as decreased shipping costs and increased availability of labor (since workers could commute from a broader region). These positive external economies could enhance the overall economic viability of the region.

According to economic development contacts surveyed in the area, business location prospects are reluctant to locate there in part because of distance from a four-lane highway. Businesses do not want to take the investment risk of locating in such a remote area.

APPENDIX A: OPPORTUNITY MATRIX

This appendix provides a summary table for the specific economic development and traffic growth opportunities identified in the course of the study. The following variables are populated for each opportunity listed in the table:

- Brief Opportunity Description;
- Start and/or Opening Year;
- Industry Impacted;
- Opportunity Type;
- Location and/or Geographic Coverage;
- Closest Road Segment in Corridor;
- Source and/or Reference; and
- Probability of Occurrence.

The full matrix (provided as an attachment to this working paper) also includes:

- Notes;
- Traffic impact estimates along MT 16 between Raymond and Plentywood, Plentywood and Antelope, Antelope and Medicine Lake, and Medicine Lake and Culbertson; and
- Traffic impact estimates along US 2 between Culbertson and Bainville, and between Bainville and the North Dakota Border.

Table A-1: Opportunity Matrix

Index	Brief Opportunity Description	Start / Opening Year	Industry Impacted[25]	Opportunity Type	Location / Geographic Coverage	Closest Road Segment in Corridor[26]	Notes	Sources
1	Pulse Crops - can be planted in fallow crop rotation, benefit of adding nitrogen to soil	Current	Agriculture	Socio-Economic	Study Area	Entire Corridor		Official with Montana Dept of Agriculture
2	Popularity of organic products	Current	Agriculture	Socio-Economic	Study Area	Entire Corridor		
3	Increase in safflower production - trend toward use of healthier oils (safflower oil)	Unknown	Agriculture	Socio-Economic	Study Area	Entire Corridor		www.montola.com
4	Vegetable processing plant	Unknown	Agriculture	Socio-Economic	Unknown	Unknown		Meeting with - MDOC
5	Milk reduction facility	Unknown	Agriculture	Socio-Economic	Sidney	Along MT 16	There are enough onion growers in the area to make this possible	Meeting with - Great Northern Development Corporation
6	Growth in safflower production for use in bio-diesel production	Current	Agriculture	Socio-Economic	Roosevelt County (Culbertson)	Entire Corridor	If one more dairy operation is put in place in Sidney, there will be enough critical mass to develop a milk reduction facility (value added production)	Bio-energy Source in Montana
7	Growth in truck traffic from Canada - imports (specifically Canola oil) will be needed to have adequate seed to crush for maintenance of bio-diesel refinery	Unknown	Agriculture	Socio-Economic	Roosevelt County (Culbertson)	Along MT 16		Meeting with the Fort Peck Tribal Council

[25] The choices of industries within the dropdown menu are: Agriculture, Energy, Tourism, Transportation, and Other.
[26] The segment choices are: Unknown, Entire Corridor, Along MT 16 and Along US 2.

Index	Brief Opportunity Description	Start / Opening Year	Industry Impacted[25]	Opportunity Type	Location / Geographic Coverage	Closest Road Segment in Corridor[26]	Notes	Sources
8	Growth in production of camelina seed for use in bio-diesel production	Unknown	Agriculture	Socio-Economic	Study Area	Entire Corridor		Meeting with the Fort Peck Tribal Council
9	Increase in cattle numbers as a result of increased feed grain from ethanol byproduct	Unknown	Agriculture	Socio-Economic	Study Area	Entire Corridor		
10	Irrigation projects on the Fort Peck reservation	Unknown	Agriculture	Socio-Economic	Fort Peck	Along MT 16		Meeting with the Fort Peck Tribal Council
11	Increased truck traffic resulting from further consolidation of loading facilities	Unknown	Agriculture	Socio-Economic	Study Area	Entire Corridor		Meeting with MDOC
12	Plans to build a 110-car loading facility in Culbertson	Unknown	Agriculture	Socio-Economic	Culbertson	Entire Corridor		Meeting with MDOC (Columbia Barge Company has bought the land) (or Continental Grain & Barge (CGB) Company)
13	Possibility of 110-car loading facility being built in Westby	Unknown	Agriculture	Socio-Economic	Westby	Along MT 16		
14	Conversion of 56-car grain elevator south of Plentywood into a feed lot	Unknown	Agriculture	Socio-Economic	Plentywood	Along MT 16		Meeting with the Fort Peck Tribal Council
15	Oil exploration	Current	Energy	Socio-Economic	Study Area	Entire Corridor		
16	Increased truck traffic resulting from need to truck oil	Current	Energy	Socio-Economic	Study Area	Entire Corridor		Montana Representative for Fish and Wildlife

Index	Brief Opportunity Description	Start / Opening Year	Industry Impacted[25]	Opportunity Type	Location / Geographic Coverage	Closest Road Segment in Corridor[26]	Notes	Sources
17	Talks of building oil refinery outside of Culbertson	Unknown	Energy	Socio-Economic	Culbertson	Entire Corridor		Meeting with the Fort Peck Tribal Council
18	Fischer-Trop plant (to turn coal into liquid fuel)	Unknown	Energy	Socio-Economic	Otter Creek	Along US 2		http //www missoulanews com/News/News asp?no=5 158 http //energyfuture mt gov/
19	Valley County Wind Energy Project	2008	Energy	Socio-Economic	Valley County	Along MT 16		http //energyfuture mt gov/
20	Nelson Creek Project (lignite-fired power plant)	2009	Energy	Socio-Economic	Circle	Unknown		http //energyfuture mt gov/
21	Montola/Sustainable Systems Project (bio-diesel refinery)	Current	Agriculture	Socio-Economic	Roosevelt County (Culbertson)	Entire Corridor		http //energyfuture mt gov/
22	Ethanol production plant	Unknown	Agriculture	Socio-Economic	Fort Peck	Unknown		Meeting with the Fort Peck Tribal Council
23	Yellowstone Ethanol LLC Power Plant	2006	Agriculture	Socio-Economic	Between Williston and Fairview	Along US 2		Press Release - 7/6/06 http //sidneyherald com/articles/2006/07/09/news/news03 txt
25	Job creation - need for workers to develop and maintain energy projects	Unknown	Other	Socio-Economic	Study Area	Entire Corridor	50 million gallon/year ethanol plant (up to 100 mil gal/yr in future), Cost = $120 million, Building 400 construction jobs ($6 million in construction wages), Maintenance 40 jobs	

Index	Brief Opportunity Description	Start / Opening Year	Industry Impacted[25]	Opportunity Type	Location / Geographic Coverage	Closest Road Segment in Corridor[26]	Notes	Sources
							(annual payroll in excess of $1.5 million). Market for 100,000 to 200,000 acres of dry land and irrigated crops in the Mon-Dak region. 18-20 million bushels of corn and up to 2 million bushels of barley or wheat needed per year for the plant Byproduct from plant will feed 250,000 feeder cattle	
26	Re-establish an old oil refinery	Unknown	Energy	Socio-Economic	Intersection of US2 and MT13 (west of Wolf Point)	Along US 2		Meeting with Roosevelt County Commission
27	Talks of developing a destination resort in the Fort Peck area	Unknown	Tourism	Socio-Economic	Fort Peck	Along US 2		Meeting with the Fort Peck Tribal Council
28	Completion of museums and dig sites along the Dinosaur Trail	Unknown	Tourism	Socio-Economic	Study Area	Entire Corridor		
29	Increased information kiosks and rest stops	Unknown	Tourism	Regulatory	Study Area	Entire Corridor		Meeting with a Representative of the Missouri River Country
30	Increased signage	Unknown	Tourism	Regulatory	Study Area	Entire Corridor		Montana Representative for Fish and Wildlife
31	Standardization of regulatory codes with other states and Canada	Unknown	Transportation	Regulatory	Study Area	Entire Corridor		Various Representatives of Transportation Firms in the Region
32	Time incentive for trucks to cross at Port of Raymond as opposed to Port of Portal	Unknown	Transportation	Regulatory	Port of Raymond	Along MT 16		Meeting with US Customs and Border Protection

Index	Brief Opportunity Description	Start / Opening Year	Industry Impacted[25]	Opportunity Type	Location / Geographic Coverage	Closest Road Segment in Corridor[26]	Notes	Sources
33	Fed Ex hub	Unknown	Transportation	Socio-Economic	Plentywood	Along MT 16		Meeting with Sheridan County Commissioners
34	Municipal and Rural Water Pipeline project	Unknown	Other	Socio-Economic	Glasgow to Plentywood	Along MT 16		Meeting with the Fort Peck Tribal Council
35	Harmonization of Operation Hours at Port	Unknown	All	Regulatory	MT/SK Border	Along MT 16		
36	Interchange of Freight Traffic between W SK & Southern US	Unknown	Transportation	Socio-Economic	Unknown	Entire Corridor		

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Working Paper #3:

Methodological Framework

Montana Department of Transportation

TRANSPORTATION REGIONAL ECONOMIC DEVELOPMENT

TRED

THEODORE ROOSEVELT EXPRESSWAY

Working Paper #3: Methodological Framework

Final

Prepared by:

HDR | HLB Decision Economics Inc.
8403 Colesville Road, Suite 910
Silver Spring, Maryland 20910
Tel: (240) 485-2600
Fax: (240) 485-2635

April 2007

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1: INTRODUCTION

This Working Paper is part of the US 2/MT 16 Theodore Roosevelt Expressway Development Study. The purpose of the study is to identify the economic, regulatory, or operational changes that would result in traffic and safety conditions justifying the expansion of the Theodore Roosevelt Expressway section in Montana to a 4-lane facility.

This Working Paper provides the methodological framework for the creation of a traffic and freight forecasting model for the study corridor. The paper builds upon research conducted for the previous working papers: Working Paper #1, an assessment of existing conditions and Working Paper #2, an analysis of existing and future economic opportunities in the study area.

In developing the forecasting model, several steps were carried out. After an initial review of existing conditions in the study area, telephone interviews were conducted to gain an understanding of opportunities for structural changes in the regional and local economy. A Risk Analysis Process Reference Book and Workbook introducing the traffic forecasting model designed by the research team and presenting historical data and baseline estimates for all key inputs to the model was then presented to a team of experts and stakeholders in the region. During this "RAP (Risk Analysis Process) Session," panelists were provided the opportunity to evaluate the model's variables and input values. Using the feedback from this session, the research team created the final traffic and freight forecasting model.[1]

The methodology discussed in this Working Paper utilizes input assumptions designed to forecast long-term average traffic volumes along the study area corridor. By focusing on long-term averages, any short-term fluctuations due to such events as economic booms, recessions, or droughts are evened out over time. Therefore, the research team believes the forecasting results generated by this modeling process are neither overly optimistic nor pessimistic in nature.

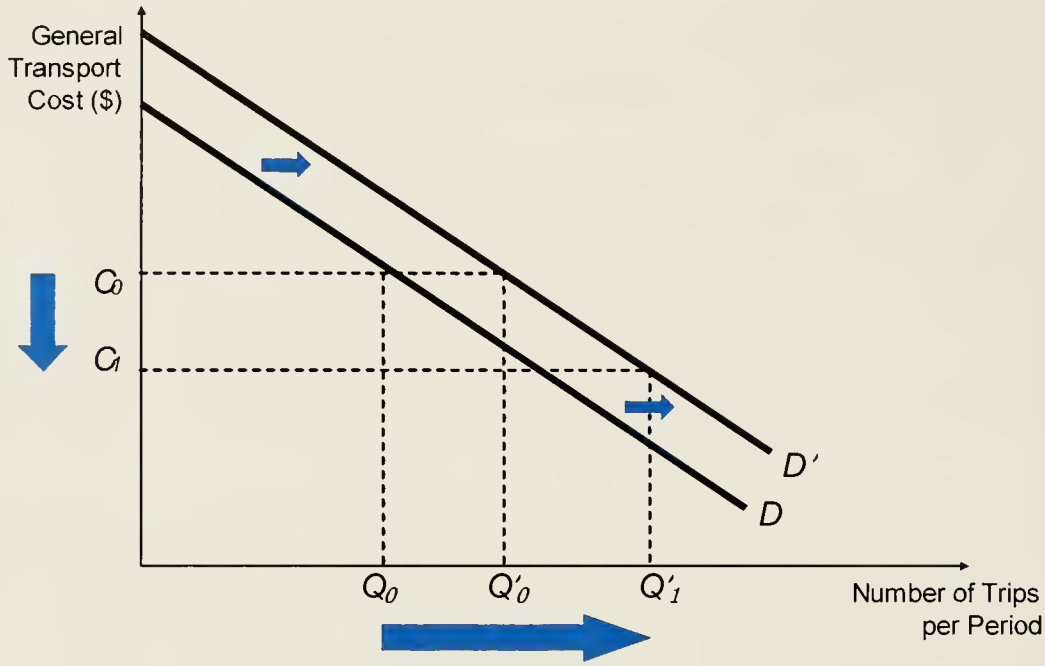
After this introductory chapter, Chapter 2 provides a conceptual framework for the model used. Chapter 3 then gives an overview of the forecasting model and Chapter 4 provides a summary of the forecasting assumptions used. An overview of the spreadsheet model is provided in Chapter 5. Finally, Chapter 6 presents the immediate next steps of the study. A list of the panelists who participated in the RAP session as well as a RAP Primer can be found in the appendices.

[1] Although the model methodology does not explicitly address ADT suppression possibilities within the "Opportunity Register", these negative ADT effects are partially reflected in 1) the probability of an ADT opportunity occurring as expressed by the expert panelists, and 2) the traffic impact values assumed for specific opportunities.

2: CONCEPTUAL FRAMEWOK AND METHODOLOGY

The framework developed for this study is best described by considering the demand for transportation, a relationship between the generalized price of transportation and the number of trips (per day, week or year), as shown in Figure 1 below. [2]

Figure 1: The Demand for Transportation, *an Illustration*



C_0: Initial price of the cost of transportation.

Q_0: Initial quantity of transportation demanded.

C_1: Price level of transportation after highway infrastructure improvements are completed.

Q_1: New quantity of transportation demanded after highway infrastructure improvements are completed.

Q'_0: New quantity of transportation demanded because of an increase in demand due to growth in existing opportunities.

[2] Due to low congestion levels in the study area, the supply curve for transportation is essentially flat, and can be ignored in this graphical representation.

The demand schedule is downward sloping: as the general price of transportation decreases (due to improved access or lower vehicle operating costs, for example), people are willing to make more trips; in other words the quantity of trips demanded increases. Conversely, as the generalized price of transportation increases (due to higher gasoline prices, for example), people are less willing to make trips, resulting in a decrease in the quantity of trips demanded.

This framework can be used to illustrate the changes considered in the study:

- The impact of existing development opportunities is represented by a shift in the demand curve, from D to D': at any transport cost level, there will be more trips demanded in the study area.

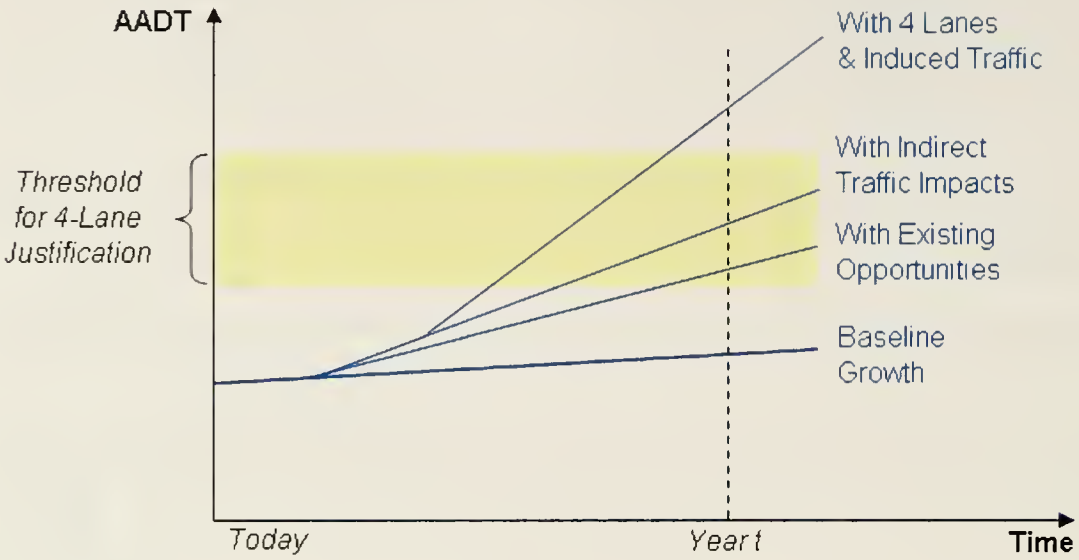
- The impact of future infrastructure improvements is represented by a reduction in the general cost of transport from C_0 to C_1, and a movement along the (new) demand curve D.'

The methodology and forecasting model, introduced in the next chapter, seeks to estimate the change in completed trips from Q_0 to Q'_0 (resulting from a shift in the demand schedule from D to D') and from Q'_0 to Q'_1 (resulting from future highway improvements and "induced" demand).

Figure 2 below further illustrates the different traffic growth components considered in the study. Traffic growth resulting, directly and indirectly, from existing opportunities (represented as a shift in the demand curve in Figure 1) will be "added" to a long term baseline growth trend. Traffic growth originating from the 4-lane configuration is represented by the vertical distance between the top "With 4 Lanes & Induced Traffic" line and the lower "With Indirect Traffic Impacts" curve. This is further explained in Section 3.2 below.[3]

[3] See Appendix 3 for an alternate view of the model components.

Figure 2: Traffic Growth Components, *an Illustration*



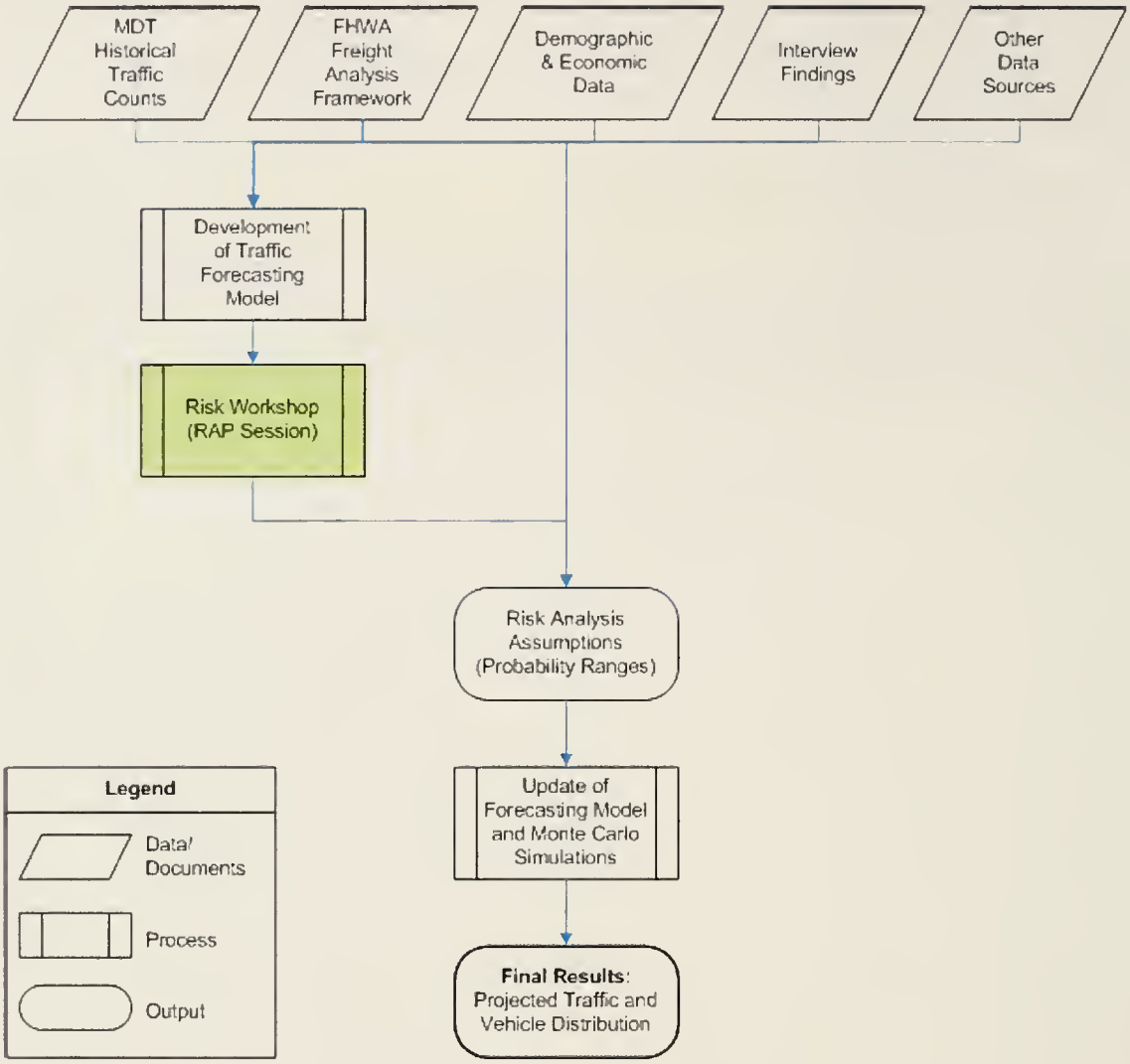
3: FORECASTING MODEL

This chapter provides an overview of HDR | HLB's approach to forecasting traffic on the Montana portion of the TRED corridor as well as a description of the variables used as inputs to the model.

3.1 Structure and Logic Diagrams

An overview of the method used in the development and estimation of the traffic forecasting model (including a list of the data sources considered, the proposed risk elicitation techniques and future refinements to the modeling framework) is shown in Figure 3, on the next page. Figure 4 then goes into a presentation of the different components (variables, parameters and relationships) of the forecasting model itself.

Figure 3: Risk Analysis Process Overview



The approach illustrated in the above chart comprises **seven major steps**:

1. Collect and analyze historical traffic data and commodity movements in the TRED corridor and larger study area;

2. Collect and review information on existing and future development opportunities, and try to assess their impact on future traffic conditions;

3. Develop a risk analysis traffic (and vehicle distribution) forecasting model;

4. Develop preliminary assumptions for all key variables and parameter values in the forecasting model;

5. Conduct a risk workshop (a RAP session) with all major project stakeholders;

6. Update all risk analysis assumptions and run Monte Carlo simulations to generate traffic and truck traffic probability distributions;

7. Report and document the simulation results.

The traffic forecasting model developed by HDR | HLB is illustrated in Figure 4, on the next page. Figure 4 provides a detailed description of how different input variables are combined together to arrive at total traffic.

The analysis began with baseline historical traffic counts for the sections that make up the Montana segment of the Theodore Roosevelt Expressway. From these traffic counts, a baseline forecast was developed, assuming the continuation of historical growth rates for both personal vehicles and trucks.

Next, a second forecast of traffic growth was calculated utilizing changes to the historical growth based on an assessment of the impacts on traffic that result from various itemized economic opportunities.

A third forecast builds on the growth from the local and regional economic opportunities, and adds traffic occurring from the "indirect" travel demand created by the expansion of industry and commerce within the region.

A final forecast adds the impact of so-called "induced demand" resulting from the four-lane expansion.

Figure 4: Structure and Logic Diagram, Traffic Forecasting Model

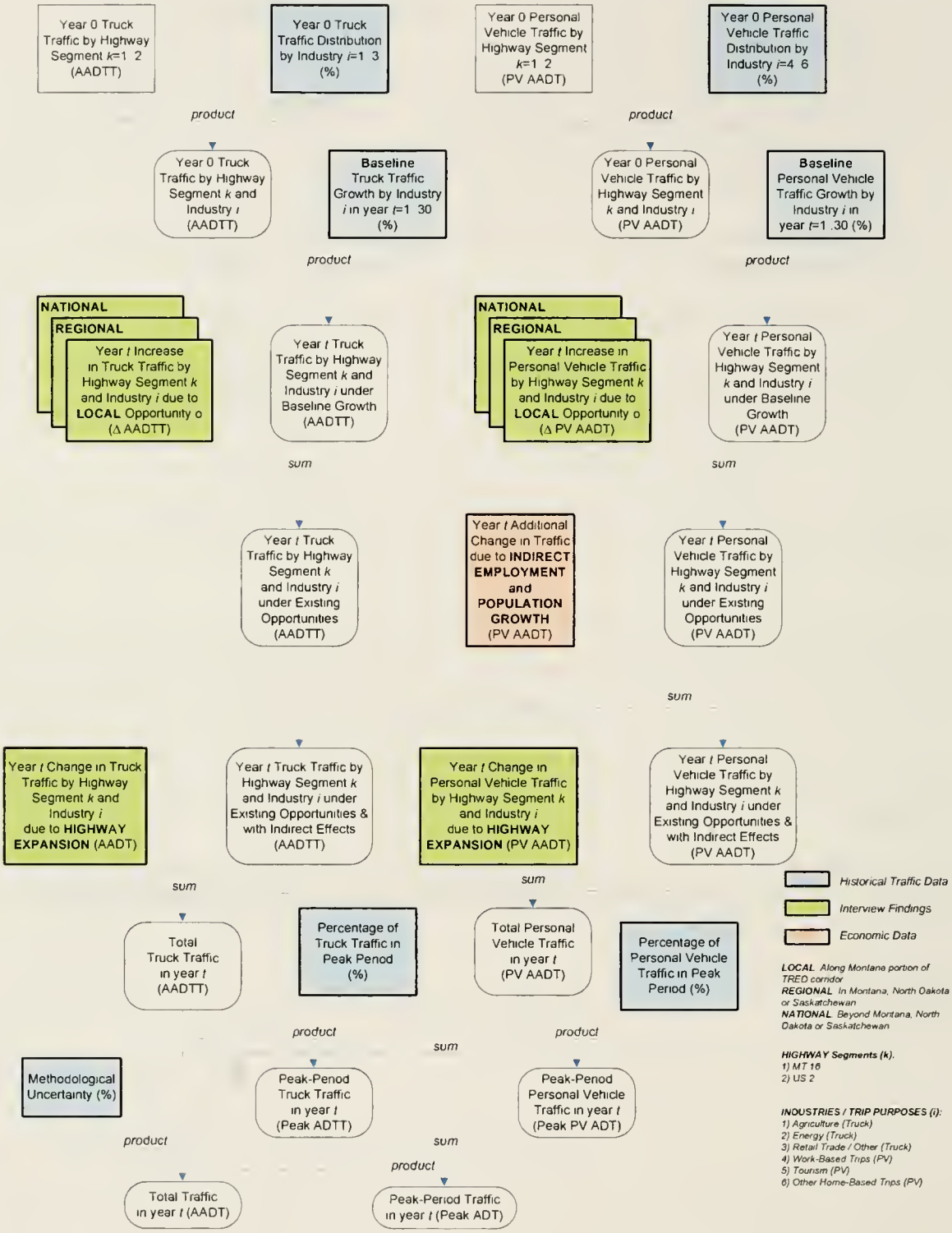
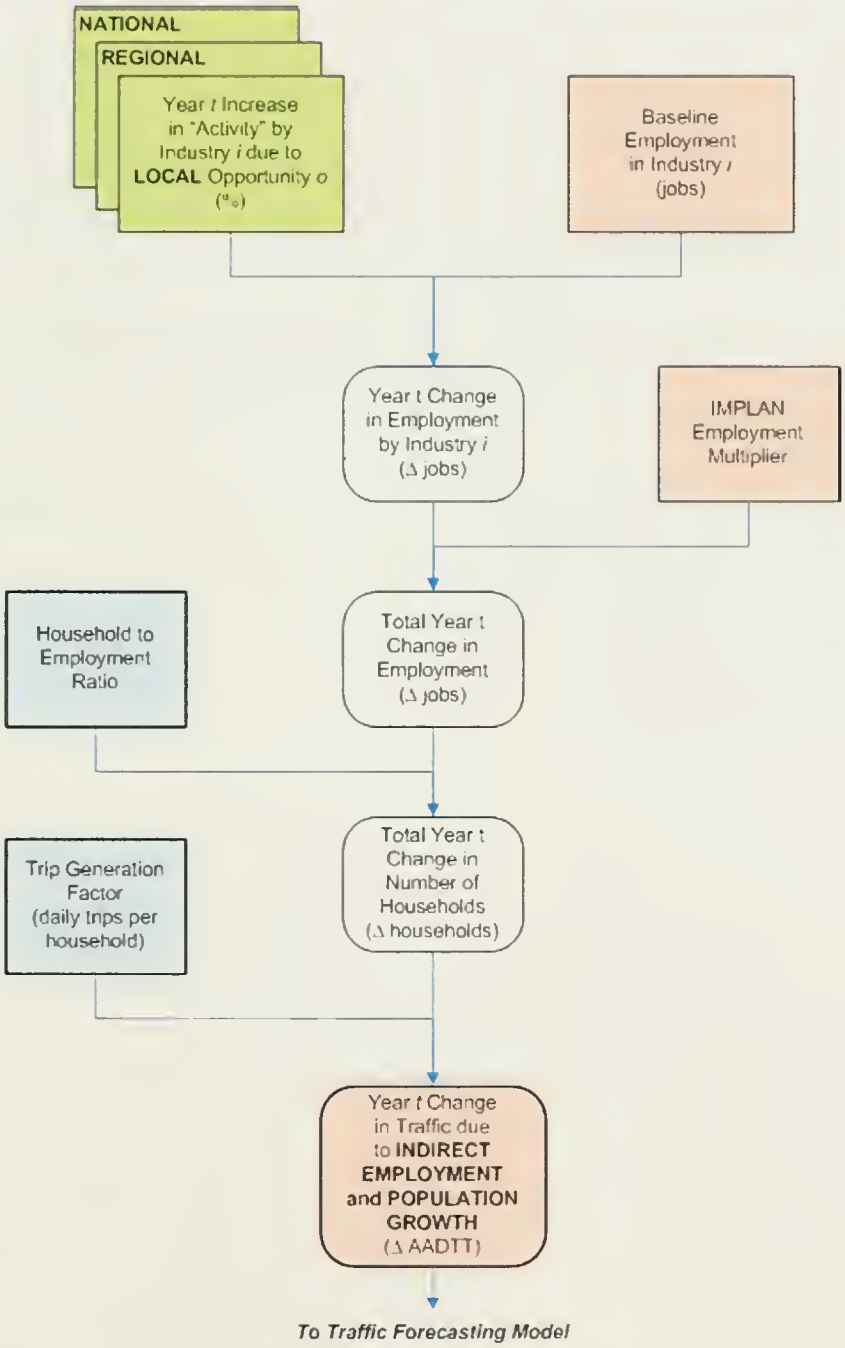


Figure 5 below illustrates the estimation of traffic changes resulting from the indirect travel demand created by the realization of existing development opportunities.

Figure 5: Structure and Logic Diagram, Estimation of Traffic Changes due to Indirect Employment and Population Growth



3.2 Variables Used in the Model

The variables used as inputs to the model are as follows:

- Base year traffic counts;
- Base year truck traffic distribution by industry;
- Base year personal vehicle traffic distribution by trip purpose;
- Baseline truck and personal vehicle traffic growth;
- Change in personal vehicle and truck traffic due to local, regional, and national opportunities (opportunity matrix);
- Additional change in traffic due to local, regional, and national opportunities without four-lane expansion;
- Additional change in traffic due to local, regional, and national opportunities with four-lane expansion;
- Percent of traffic in peak season;
- Household-to-employment ratio;
- Household trip generation factor; and
- Methodological uncertainty.

4: SUMMARY OF FORECASTING ASSUMPTIONS

This section presents the assumptions used in HDR | HLB's risk analysis traffic forecasting model. To facilitate the risk analysis framework employed in the forecasting model, each variable assumption is presented with a median, an upper 10%, and a lower 10% value.

To generate traffic projections for the next 30 years, the Opportunity Matrix presented in Section 4.6 was populated. The probability of the various economic opportunities presented in the matrix coming to fruition given different infrastructure constraints has been estimated using historical data and the views of expert panelists. The traffic volume ranges attributed to each opportunity were calculated based on general economic calculations, survey responses, and the input of expert panelists. For example, survey responses indicated that a bio-diesel plant could expect enough input and output to require an additional 5,000 to 7,500 truckloads annually, therefore, a conservative range of 20 to 40 trucks per day was assumed for that opportunity. Likewise, for agricultural opportunities the expected increase in acreage and volume of crops for the opportunity effect was calculated on an annual basis and the number of trucks necessary to transport the increased produce in daily terms was then recorded for the opportunity.

As is true for all input variables used in the model, the final variable values recorded in the opportunity register were reviewed and validated by the expert panelists.

Wherever possible the methods employed to arrive at the values in the following section used in the forecasting model are itemized.

4.1 Base Year Traffic Counts

Variable Description: The traffic counts represent the average annual daily traffic by class of vehicle (personal vehicles or large trucks) recorded along specific sections of the study area corridor. The mileage weighted averages of these counts were used as the base year traffic for the study area's sections of MT 16 and US 2.

Segment	Mileage	2005	
		Personal Vehicles	Trucks
1) Raymond to Plentywood (MT 16)	16	1,140	104
2) Plentywood to Antelope (MT 16)	10	3,945[4]	186
3) Antelope to Medicine Lake (MT 16)	14	1,360	144
4) Medicine Lake to Culbertson (MT 16)	25	1,349	143
5) Culbertson to Bainville (US 2)	12	2,140	127
6) Bainville to North Dakota Border (US 2)	10	1,330	127
Mileage Weighted Average	---	---	---
MT 16 Segment	**65**	**1,699**	**140**
US 2 Segment	**22**	**1,771**	**127**

Source: Montana Department of Transportation Temporary Traffic Data Recorders (See Appendix C)

4.2 Base Year Truck Traffic Distribution by Industry

Variable Description: This percentage accounts for how total truck ADT is distributed amongst various sectors or categories. A higher percentage means that the total share of ADT attributed to that category is larger.

Modeling Probability Ranges

Variable Name	Median	Lower 10% Limit	Upper 10% Limit
% Truck ADT, Agriculture	40	35	50
% Truck ADT, Energy	30	20	40
% Truck ADT, Retail Trade / Other	30	10	45

[4] This section of roadway has atypically high traffic (See Appendix C)

Values were derived from Freight Analysis Framework (FAF) data, first-hand observations, interview responses, and other anecdotal evidence, and were reviewed and validated by panel experts.

4.3 Base Year Personal Vehicle Traffic Distribution by Trip Purpose

Variable Description: This percentage accounts for how total Personal Vehicle (PV) ADT in the corridor is distributed amongst various categories or trip purposes. A higher percentage means that the total share of ADT attributed to that category is larger.

Modeling Probability Ranges

Variable Name	Median	Lower 10% Limit	Upper 10% Limit
% PV ADT, Work Trips	25	20	35
% PV ADT, Tourism	6	3	9
% PV ADT, Other Home-Based Trips	69	56	77

Personal vehicle distributions were generated based on aggregate tourism trips, general assumptions regarding work trips, and expert panelist input.

4.4 Baseline Truck and Personal Vehicle Traffic Growth

Variable Description: This percentage represents the average annual growth rate per year in vehicle ADT (Truck or Personal Vehicle) by the various sectors or categories (assuming existing highway infrastructure) based on historical growth trends only. A positive percentage means that ADT is expected to increase for the specific sector or category.

These rates were used for all years, except for the growth rate for energy trucks. For energy trucks a ramp-down over time of the growth rate to a more sustainable level was employed. (See Section 4.5)

Historical vehicle counts and growth rates from 2002-2005 are presented in Appendix C, Table 2.

Modeling Probability Ranges

Variable Name	Median	Lower 10% Limit	Upper 10% Limit
Truck Traffic Growth, Agriculture, %	1.0	0.0	2.0
Truck Traffic Growth, Energy, %	10.0	5.0	15.0
Truck Traffic Growth, Retail Trade / Other, %	1.0	0.5	1.5
PV Traffic Growth, Work Trips, %	0.5	0.0	1.0
PV Traffic Growth, Tourism, %	0.5	-0.5	3.0
PV Traffic Growth, Other Home-Based Trips, %	0.5	0.0	2.0

Estimates were calculated from survey responses, historical growth data, and expert panelist input.

4.5 Energy Sector Truck Traffic Growth (2012-2036)

Variable Description: This percentage represents the average annual growth rate per year in truck ADT by the energy sector for 2012-2036. Because of the higher than normal current growth rate for energy trucks, we assume that this high growth is unsustainable over the long-run; therefore, conservatively, we utilize a gradual convergence of this growth rate to a longer term historical average over time. A positive percentage means that ADT is expected to increase for the specific sector or category.

Modeling Probability Ranges

Variable Name	Median	Lower 10% Limit	Upper 10% Limit
Truck Traffic Growth, Energy, % (2012-2016)	8.0	4.0	12.0
Truck Traffic Growth, Energy, % (2017-2021)	6.0	3.0	9.0
Truck Traffic Growth, Energy, % (2022-2026)	4.0	2.0	6.0
Truck Traffic Growth, Energy, % (2027-2031)	2.0	1.0	3.0
Truck Traffic Growth, Energy, % (2032-2036)	1.0	0.5	1.5

The convergence of the energy sector truck traffic growth rates to the historical rate was calculated by HDR | HLB and assumes that energy will be an important growth element in the future.

4.6 Change in Personal Vehicle and Truck Traffic due to Local, Regional, and National Opportunities

Matrix Description: This matrix is a method to capture the expected traffic impacts due to specifically cited opportunities that could or will occur at the local, regional, and national levels. The traffic impacts are to be expressed in additional ADT affecting the specific corridor segment. Traffic impacts will be included in the model after being adjusted by the probability of the opportunity occurring under the 4-lane highway and no 4-lane highway scenarios, and the impact values will vary according to the distribution defined by the lower value, most likely, and upper values.

Items Provided in the Matrix of Specific Opportunities:

Index: A number to associate with each opportunity for ease of referral.

Description: A short description of the opportunity being examined.

Opening Year: The expected or planned opening year when the opportunity could have an influence on ADT.

Sector: The broad category indicating which sector the ADT adjustment will affect.

Location: The specific location, if possible, from where the opportunity is derived.

Segment: The section of the study area corridor that would experience the adjustment in ADT due to the specific opportunity.

Without a 4-Lane Highway

Truck or PV: Whether the opportunity would result in an increase in truck or in personal vehicle traffic.

Probability: The likelihood that the opportunity comes to fruition, without expansion of the existing corridor to a 4-lane highway.

Low: In the event that the opportunity occurs, this is the lowest level of ADT impact that could be expected.

Median: In the event that the opportunity occurs, this is the median level of ADT impact that could be expected.

High: In the event that the opportunity occurs, this is the upper level of ADT impact that could be expected.

With a 4-Lane Highway

Probability: The likelihood that the opportunity comes to fruition, if the expansion of the existing corridor to a 4-lane highway occurs.

Truck or PV: Whether the opportunity would result in an increase in truck or in personal vehicle traffic.

Low: In the event that the opportunity occurs, this is the lowest level of ADT impact that could be expected.

Median: In the event that the opportunity occurs, this is the median level of ADT impact that could be expected.

High: In the event that the opportunity occurs, this is the upper level of ADT impact that could be expected.

Opportunity Matrix

Opportunity Register						Without a 4-Lane Corridor					With a 4-Lane Corridor				
Index	Description	Opening Year	Sector	Location	Segment	Truck or PV	Probability	Median	Low	High	Truck or PV	Probability	Median	Low	High
1	Pulse Crops - can be planted in fallow crop rotation benefit of adding nitrogen to soil	2006	Agriculture	Study Area	Entire Corridor	Truck	100%	20	10	30	Truck	100%	25	15	40
2	Popularity of organic products	2006	Agriculture	Study Area	Entire Corridor	Truck	100%	2	1	3	Truck	100%	3	2	4
3	Increase in safflower production - trend toward use of healthier oils (safflower oil)	2007-2016	Agriculture	Study Area	Entire Corridor	Truck	50%	2.5	1.5	3.5	Truck	60%	3	2	4
4	Vegetable processing plant (including onions, potatoes carrots, etc.)	2007-2016	Agriculture	Study Area	Along MT 16	Truck	15%	20	10	30	Truck	40%	20	10	30
5	Milk reduction facility	2007-2016	Agriculture	Sidney	Along MT 16	Truck	15%	2	1	5	Truck	25%	2	1	5
7	Growth in truck traffic from Canada - imports (specifically Canola oil) will be needed to have adequate seed to crush for maintenance of bio-diesel refinery	2007-2016	Agriculture	Roosevelt County (Culbertson)	Entire Corridor	Truck	50%	20	10	30	Truck	65%	25	20	30

Opportunity Register						Without a 4-Lane Corridor					With a 4-Lane Corridor				
Index	Description	Opening Year	Sector	Location	Segment	Truck or PV	Probability	Median	Low	High	Truck or PV	Probability	Median	Low	High
9	Increase in cattle WEIGHT (from 400 lbs to 750 lbs) as a result of increased feed grain from ethanol byproduct	2006	Agriculture	Study Area	Entire Corridor	Truck	75%	20	10	30	Truck	85%	20	10	30
10	Irrigation projects on the Fort Peck reservation 10,000 acres added under current plan	2006	Agriculture	Fort Peck	Entire Corridor	Truck	25%	30	20	40	Truck	25%	30	20	40
11	Increased truck traffic resulting from further consolidation of loading facilities	2007-2016	Agriculture	Study Area	Entire Corridor	Truck	25%	10	5	15	Truck	40%	15	10	20
12	Plans to build a 110-car loading facility in Culbertson	2007-2016	Agriculture	Culbertson	Entire Corridor	Truck	15%	12	5	15	Truck	50%	15	10	20
13	Possibility of 110-car loading facility being built in Westby	2007-2016	Agriculture	Westby or Fortuna	Along MT 16	Truck	50%	2	1	5	Truck	65%	2	1	5
15	Oil exploration	2006	Energy	Study Area	Entire Corridor	Truck	100%	30	20	40	Truck	100%	30	20	40
16	Increased truck traffic resulting from need to truck oil	2006	Energy	Study Area	Entire Corridor	Truck	100%	40	20	60	Truck	100%	50	30	70

Opportunity Register						Without a 4-Lane Corridor					With a 4-Lane Corridor				
Index	Description	Opening Year	Sector	Location	Segment	Truck or PV	Probability	Median	Low	High	Truck or PV	Probability	Median	Low	High
17	Talks of building oil refinery outside of Culbertson (DeltaT engineering)	2007-2016	Energy	Culbertson	Entire Corridor	Truck	1%	25	15	35	Truck	2%	35	20	50
18	Coal / Fischer-Trop plant (to turn coal into liquid fuel)	2007-2016	Energy	Otter Creek	Along US 2	Truck	10%	5	2	10	Truck	15%	5	2	10
19	Valley County Wind Energy Project	2008	Energy	Valley County	Along MT 16	Truck	80%	2	1	3	Truck	90%	2	1	3
20	Nelson Creek Project (lignite-fired power plant)	2009	Energy	Circle	Along US 2	Truck	75%	5	3	8	Truck	85%	10	4	15
21	Montola / Sustainable Systems Project (bio-diesel refinery)	2006	Agriculture	Roosevelt County (Culbertson)	Entire Corridor	Truck	100%	30	20	40	Truck	100%	50	35	70
22	Ethanol production plant	2007-2016	Agriculture	Fort Peck	Along MT 16	Truck	25%	15	10	20	Truck	40%	20	10	30
23	Yellowstone Ethanol LLC Plant	2008	Agriculture	Between Williston and Fairview	Along US 2	Truck	100%	20	10	30	Truck	100%	20	10	30

Opportunity Register						Without a 4-Lane Corridor					With a 4-Lane Corridor				
Index	Description	Opening Year	Sector	Location	Segment	Truck or PV	Probability	Median	Low	High	Truck or PV	Probability	Median	Low	High
27	Talks of developing a destination resort in the Fort Peck area. Built on the old airport site (after airport relocation)	2007-2016	Tourism	Fort Peck	Along US 2	PV	25%	200	100	300	PV	25%	250	150	350
28	Completion of museums and dig sites along the Dinosaur Trail (note paleo-center and field station exists)	2007-2016	Tourism	Study Area	Entire Corridor	PV	100%	10	5	20	PV	100%	30	15	45
30	Increased signage	2007-2016	Tourism	Study Area	Entire Corridor	PV	50%	2	0	3	PV	75%	3	2	5
31	Standardization of regulatory codes with other states and Canada, e.g., single weight standard between MT, ND and SK would stimulate regional traffic. For cross-border traffic, too many states involved, local harmonization would not help.	2007-2016	Retail Trade / Other	Study Area	Entire Corridor	Truck	15%	5	2	10	Truck	15%	5	2	10
32	Time incentive for trucks to cross at Port of Raymond as opposed to Port of Portal. Distance is key to access Midwest markets, Portal is shorter distance. Preferred route even though average wait time at Portal is 2 hours vs 10 minutes at Raymond. Truckers know when to show up to avoid queuing	2007-2016	Retail Trade / Other	Port of Raymond	Along MT 16	Truck	50%	5	2	10	Truck	75%	10	4	20

Opportunity Register						Without a 4-Lane Corridor					With a 4-Lane Corridor				
Index	Description	Opening Year	Sector	Location	Segment	Truck or PV	Probability	Median	Low	High	Truck or PV	Probability	Median	Low	High
33	Fed Ex hub	2007-2016	Retail Trade / Other	Plentywood	Along MT 16	Truck	5%	10	5	12	Truck	5%	12	8	14
34a	Municipal and Rural Water Pipeline project	2007-2016	Other Home-Based Trips	Glasgow to Plentywood	Along MT 16	PV	50%	50	20	75	PV	60%	60	30	100
34b	Municipal and Rural Water Pipeline project	2007-2016	Retail Trade / Other	Glasgow to Plentywood	Along MT 16	Truck	50%	2	1	3	Truck	60%	2	1	3
35	Harmonization of hours of operation across the border at Raymond / Regway	2007-2016	Retail Trade / Other	MT/SK Border	Along MT 16	Truck	10%	10	5	15	Truck	10%	15	10	20
36	Interchange of freight traffic between W SK & Southern US	2007-2016	Retail Trade / Other	Unknown	Entire Corridor	Truck	10%	20	15	35	Truck	50%	40	30	60
37	MT Cowboy Hall of Fame	2006	Tounsm	Wolf Point	Along US 2	PV	100%	10	5	20	PV	100%	30	15	45

4.7 Additional Personal Vehicle and Truck Traffic due to Local, Regional, and National Opportunities without Four-Lane Expansion

Variable Description: This value represents the additional vehicle ADT (Truck or Personal Vehicle) due to existing local, regional, and national opportunities (without a four-lane corridor) beyond those listed in the Opportunity Matrix. A positive number means that ADT will increase for that vehicle classification. These ADT values are added into the model over the years 2007 to 2011.[5]

Modeling Probability Ranges

Variable Name	Median	Lower 10% Limit	Upper 10% Limit
Additional Truck Traffic, ADT	210	200	220
Additional Personal Vehicle Traffic, ADT	90	70	100

The values represent 20% of the potential additional ADT arising from itemized opportunities in the opportunity matrix for a two-lane roadway. Values are assumed to be additional ADT that would occur due to synergies created by the opportunities themselves, and also accounts for any unspecified opportunities that may arise. The 20% assumption was derived by the research team and discussed during the RAP session. It is believed to represent a conservative value.

[5] Model results, including the contribution to overall ADT by the itemized opportunities are presented in Working Paper #4.

4.8 Additional Personal Vehicle and Truck Traffic due to Local, Regional, and National Opportunities with Four-Lane Expansion

Variable Description: This value represents the additional vehicle ADT (Truck or Personal Vehicle) due to existing local, regional, and national opportunities (with a four-lane corridor) beyond those listed in the Opportunity Matrix.[6] A positive number means that ADT will increase for that vehicle classification. These ADT values are added into the model over the years 2007 to 2011.

Modeling Probability Ranges

Variable Name	Median	Lower 10% Limit	Upper 10% Limit
Additional Truck Traffic, ADT	280	270	290
Additional Personal Vehicle Traffic, ADT	200	180	220

The values represent 20% of the potential additional ADT arising from itemized opportunities in the opportunity matrix for a four-lane roadway. Values are assumed to be additional ADT that would occur due to synergies created by the opportunities themselves, and also accounts for any unspecified opportunities that may arise. The 20% assumption was derived by the research team and discussed during the RAP session and is believed to represent a conservative value.

4.9 Percent of Traffic in Peak Season

Variable Description: This percentage represents the relative ratio of average daily traffic that occurs in the peak traffic season compared to the overall yearly average. A higher number indicates more traffic, relative to the average annual daily traffic, occurs within the peak traffic season.

Modeling Probability Ranges

Name	Median	Lower 10% Limit	Upper 10% Limit
Peak Season Traffic Relative to Yearly AADT, %	125	110	200

[6] Non-itemized national "opportunities" may include diversion from adjacent corridors, or increases in truck traffic along the GPITC corridor.

Percentages were generated by observing monthly traffic counts over several years for the study area corridor (See Appendix C).

4.10 Household-to-Employment Ratio

Variable Description: This variable establishes a relationship between the number of employees and the number of households in the immediate study area. It is used to estimate the indirect impacts of existing opportunities: if an opportunity materializes and leads to an increase in local employment, what will the likely increase in the number of households be? A value of 1.0 implies that each job created / retained would lead to one additional / retained household. A value of 0.5 implies that two jobs would have to be created in the study area for one household to move-in / stay. A higher household-to-employment ratio implies that, other things being equal, a given job-creating opportunity will lead to more households moving into, or staying in, the study area.

Modeling Probability Ranges

Name	Median	Lower 10% Limit	Upper 10% Limit
Household to Employment Ratio	0.65	0.60	0.70

Values were calculated by HDR | HLB using employment and household data from the 2000 Census and the Bureau of Economic Analysis for the six-county study[7] area. Total households were divided by the total employment within the study area to arrive at the median estimate.

4.11 Household Trip Generation Factor

Variable Description: This variable represents the average daily number of trips generated by one household, including commuting trips, schooling and shopping trips, family visits and others. It is used to estimate the indirect traffic impacts associated with existing development opportunities. Other things being equal, a higher trip generation factor will lead to more indirect traffic resulting from existing opportunities.

Modeling Probability Ranges

Name	Median	Lower 10% Limit	Upper 10% Limit
Household Trip Generation Factor	3.0	2.0	6.0

[7] The six-county study area comprises Daniels, McCone, Richland, Roosevelt, Sheridan, and Valley Counties in Montana.

Values were derived by HDR | HLB based on data provided in the Trip Generation Manual.

4.12 Methodological Uncertainty

Variable Description: This factor accounts for the error in the traffic estimates due to methodological uncertainty. A positive value means that the traffic estimates are too low, while a negative value means that the estimates are too high. A higher (positive) percentage implies a higher overall traffic count (the traffic estimates are adjusted upward).

Modeling Probability Ranges

Variable Name	Median	Lower 10% Limit	Upper 10% Limit
Methodological Uncertainty, %	0.0	-10.0	10.0

Values are HDR | HLB's assumptions accounting for the general uncertainty inherent in a modeling process.

5: OVERVIEW OF THE SPREADSHEET MODEL

This chapter presents details of how the model calculates forecasts for overall traffic and freight distributions for each segment of the study area corridor. This section analyzes the generation of the two-lane forecasts, the four-lane forecasts, and the peak season forecasts.

5.1 Two-Lane Forecasts

The forecasting model begins with the base year traffic counts (Section 4.1). These are the mileage-weighted AADT numbers for MT 16 and US 2 for 2005 and being the most recent comprehensive data these were used as the base year values.

The raw AADT counts for trucks are then multiplied by the truck traffic distribution by industry (Section 4.2) to arrive at the number of trucks attributable to agriculture, energy, and retail trade / other traffic. Similarly, the raw personal vehicle AADT numbers are multiplied by the personal vehicle traffic distributions by trip purpose (Section 4.3) to arrive at the number of personal vehicles attributable to work-based trips, tourism, and other home-based trips. The results are AADT numbers for trucks and personal vehicles on MT 16 and US 2 in the base year.

A traffic forecast is then created that assumes the base AADT numbers increase at the traffic growth rates (Sections 4.4–4.5) from 2007 to 2036. Output from this forecast takes the form of overall AADT on MT 16 and US 2 for each year along with the percentage of this overall AADT that is attributable to truck traffic.

(Model screenshot for illustration purposes only)[8]

Figure 6: Two-Lane Forecasts, Historical Growth Rates Only

ADT Calculations	Year	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	20
	Year Index	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	1
Historical Growth Forecast																	
Truck Traffic																	
Agriculture																	
	MT 16	59.01	59.60	60.20	60.80	61.41	62.02	62.64	63.27	63.90	64.54	65.18	65.84	66.49	67.16	67.83	68
	US 2	53.53	54.07	54.61	55.15	55.70	56.26	56.82	57.39	57.97	58.55	59.13	59.72	60.32	60.92	61.53	62
	Overall	59.01	59.60	60.20	60.80	61.41	62.02	62.64	63.27	63.90	64.54	65.18	65.84	66.49	67.16	67.83	68
Energy																	
	MT 16	42.00	46.20	50.82	55.90	61.49	67.64	74.40	81.84	90.03	99.03	108.93	119.83	131.81	144.99	159.49	175
	US 2	38.10	41.91	46.10	50.71	55.78	61.36	67.49	74.24	81.67	89.83	98.82	108.70	119.57	131.53	144.68	159
	Overall	42.00	46.20	50.82	55.90	61.49	67.64	74.40	81.84	90.03	99.03	108.93	119.83	131.81	144.99	159.49	175
Retail Trade / Other																	
	MT 16	38.99	39.38	39.78	40.17	40.58	40.98	41.39	41.80	42.22	42.65	43.07	43.50	43.94	44.38	44.82	45
	US 2	35.37	35.73	36.08	36.44	36.81	37.18	37.55	37.92	38.30	38.69	39.07	39.46	39.86	40.26	40.66	41
	Overall	38.99	39.38	39.78	40.17	40.58	40.98	41.39	41.80	42.22	42.65	43.07	43.50	43.94	44.38	44.82	45
Personal Vehicle Traffic																	
Work Based Trips																	
	MT 16	461.29	463.60	465.91	468.24	470.58	472.94	475.30	477.68	480.07	482.47	484.88	487.30	489.74	492.19	494.65	497
	US 2	480.84	483.24	485.66	488.09	490.53	492.98	495.44	497.92	500.41	502.91	505.43	507.95	510.49	513.05	515.61	518
	Overall	480.84	483.24	485.66	488.09	490.53	492.98	495.44	497.92	500.41	502.91	505.43	507.95	510.49	513.05	515.61	518
Tourism																	
	MT 16	101.94	103.11	104.29	105.48	106.69	107.92	109.15	110.40	111.67	112.95	114.24	115.55	116.88	118.22	119.57	120
	US 2	106.26	107.48	108.71	109.95	111.21	112.49	113.78	115.08	116.40	117.74	119.09	120.45	121.83	123.23	124.64	126
	Overall	106.26	107.48	108.71	109.95	111.21	112.49	113.78	115.08	116.40	117.74	119.09	120.45	121.83	123.23	124.64	126
Other Home-Based Trips																	
	MT 16	1135.77	1146.35	1157.03	1167.81	1178.69	1189.67	1200.75	1211.93	1223.22	1234.62	1246.12	1257.73	1269.44	1281.27	1293.20	1305
	US 2	1183.91	1194.93	1206.08	1217.30	1228.64	1240.08	1251.63	1263.29	1275.06	1286.94	1298.93	1311.03	1323.24	1335.56	1348.01	1360
	Overall	1183.91	1194.93	1206.08	1217.30	1228.64	1240.08	1251.63	1263.29	1275.06	1286.94	1298.93	1311.03	1323.24	1335.56	1348.01	1360
Total ADT																	
	MT 16	1839.00	1858.23	1878.02	1898.41	1919.44	1941.16	1963.64	1986.93	2011.11	2036.25	2062.43	2089.75	2118.30	2148.20	2179.56	2212
	(% Trucks)	7.61%	7.81%	8.03%	8.26%	8.52%	8.75%	9.05%	9.41%	9.75%	10.13%	10.53%	10.97%	11.44%	11.94%	12.49%	13.0
	US 2	1898.00	1917.35	1937.22	1957.64	1978.67	2000.35	2022.72	2045.86	2069.81	2094.65	2120.46	2147.32	2175.31	2204.54	2235.13	226
	(% Trucks)	6.69%	6.87%	7.06%	7.27%	7.49%	7.74%	8.00%	8.29%	8.60%	8.93%	9.29%	9.68%	10.10%	10.56%	11.04%	11.5
	Overall	1898.00	1917.35	1937.22	1957.64	1978.67	2000.35	2022.72	2045.86	2069.81	2094.65	2120.46	2147.32	2175.31	2204.54	2235.13	226

[8] Complete graphical and tabular model results are presented in Working Paper #4

Figure 6 is an illustration of the model's two-lane forecasting calculations using historical growth rates only. Forecasts are calculated by vehicle type, sector, and corridor segment.

A second incremental forecast is then generated that takes into account traffic growth that can occur beyond that created by the baseline traffic growth rates. This forecast is created by acknowledging that there are certain opportunities within the region that can lead to increased truck or personal vehicle traffic.

A matrix of traffic opportunities (Section 4.6) itemizes the specific opportunities within the model along with the probabilities of their occurrence, the year they occur, which roadway they would affect, whether it would result in truck or personal vehicle traffic, and the range of additional traffic that would be generated if the opportunity occurred. This matrix records these values for both a two-lane highway (base case) and for a four-lane highway.

The year of occurrence within the matrix can be uncertain and in those cases the model assumes the opportunity will happen sometime between 2007 and 2016 with uniform probability. AADT output from this matrix of opportunities is added, over a five year ramp-up period, to the base year AADT numbers for the corresponding year in which they occur. Similarly, additional AADT (Section 4.7) that accounts for additional truck or personal vehicle traffic arising from local, regional, or national opportunities, beyond those itemized in the matrix, is also added to the base year AADT over a five year ramp-up period from 2007 to 2011.

Finally, the resulting AADT is assumed to grow at the traffic growth rates (Section 4.4-4.5) from 2007 to 2036. This results in a new traffic forecast that takes into account opportunities for traffic growth beyond just the baseline traffic growth rates.

(Model screenshot for illustration purposes only)

Figure 7: Two-Lane Forecasts, ADT Opportunities Included

ADT Calculations	Year	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
	Year Index	0	1	2	3	4	5	6	7	8	9	10	11
2-Lane With Opportunity Register													
Truck Traffic													
Agriculture													
	MT 16	59.01	74.68	91.05	108.12	125.90	144.40	148.00	151.09	153.68	155.76	157.31	158.8
	US 2	53.53	69.15	89.50	110.60	132.44	155.04	162.79	166.03	168.77	171.00	172.71	174.4
	Overall	59.01	74.68	91.05	110.60	132.44	155.04	162.79	166.03	168.77	171.00	172.71	174.4
Energy													
	MT 16	42.00	62.18	85.42	111.56	140.90	173.76	193.93	215.08	237.76	262.12	288.34	317.1
	US 2	38.10	57.90	80.26	106.64	136.24	169.40	189.88	211.82	234.17	258.18	284.00	312.3
	Overall	42.00	62.18	85.42	111.56	140.90	173.76	193.93	215.08	237.76	262.12	288.34	317.1
Retail Trade - Other													
	MT 16	38.99	39.92	41.40	43.43	46.02	49.17	51.82	53.95	55.57	56.66	57.23	57.80
	US 2	35.37	36.26	37.70	39.70	42.25	45.36	47.97	50.07	51.65	52.70	53.23	53.76
	Overall	38.99	39.92	41.40	43.43	46.02	49.17	51.82	53.95	55.57	56.66	57.23	57.80
Personal Vehicle Traffic													
Work Based Trips													
	MT 16	461.29	464.40	468.33	473.08	478.66	485.08	490.72	495.58	499.67	502.97	505.49	508.0
	US 2	480.84	484.05	488.07	492.93	498.61	505.12	510.86	515.83	520.01	523.42	526.04	528.6
	Overall	480.84	484.05	488.07	492.93	498.61	505.12	510.86	515.83	520.01	523.42	526.04	528.6
Tourism													
	MT 16	101.94	103.92	106.72	110.38	114.88	122.70	129.80	136.17	141.81	146.70	148.39	150.0
	US 2	106.26	110.74	116.09	122.31	129.40	139.85	147.15	153.72	159.56	164.65	166.54	168.4
	Overall	106.26	110.74	116.09	122.31	129.40	139.85	147.15	153.72	159.56	164.65	166.54	168.4
Other Home-Based Trips													
	MT 16	1135.77	1147.16	1159.46	1172.68	1186.84	1201.93	1216.36	1230.11	1243.18	1255.57	1267.27	1279.0
	US 2	1183.91	1195.74	1208.49	1222.17	1236.79	1252.35	1267.24	1281.47	1295.02	1307.89	1320.07	1332.5
	Overall	1183.91	1195.74	1208.49	1222.17	1236.79	1252.35	1267.24	1281.47	1295.02	1307.89	1320.07	1332.5
Total ADT													
	MT 16	1839.00	1892.26	1952.38	2019.25	2093.20	2177.04	2230.61	2281.99	2331.67	2379.79	2424.02	2471.0
	(% Trucks)	7.61%	9.34%	11.16%	13.03%	14.94%	16.87%	17.65%	18.41%	19.17%	19.94%	20.75%	21.60%
	US 2	1898.00	1953.84	2020.12	2094.34	2175.73	2267.12	2325.88	2378.93	2429.18	2477.84	2522.58	2570.0
	(% Trucks)	6.69%	8.36%	10.27%	12.27%	14.29%	16.31%	17.23%	17.99%	18.71%	19.45%	20.21%	21.03%
	Overall	1898.00	1953.84	2020.12	2094.34	2175.73	2267.12	2325.88	2378.93	2429.18	2477.84	2522.58	2570.0

Figure 7 illustrates model forecasts that include ADT from the Opportunity Matrix for a two-lane highway in addition to the forecasts using only traffic growth rates.

The final overall two-lane traffic forecast is then generated by taking into account indirect traffic growth that would occur from increases in work-based and other home-based personal vehicle trips due to the aforementioned opportunities. The baseline (without traffic growth rates being applied) AADT numbers from the previous opportunities' forecast are incremented over a five year ramp-up period by the AADT attributable to this indirect growth. These indirect effect calculations make use of IMPLAN[9], an input-output model software package.

Specifically, the traffic forecasting model incorporates an employment multiplier associated with Richland, Roosevelt, and Sheridan counties. From this multiplier the indirect effects due to gains in employment can be measured. The gains in employment within other sectors due to an increase in traffic in one sector are calculated by assuming that the amount of traffic increase, as a percentage of overall traffic for that sector, approximates the percentage gain in employment expected.

Once the numbers of indirect employment gains are generated they are multiplied by the household-to-employment ratio (Section 4.10) to arrive at the additional number of households that would be gained within the region due to the new employment opportunities. Next the number of new households is multiplied by the household trip generation factor (Section 4.11) calculate the additional daily personal vehicle trips that can be expected due to the increase in the number of households. The model then calculates the work-based and other home-based

[9] Minnesota IMPLAN Group, Inc. www.implan.com

personal vehicle trips that would be generated by the growth in the agriculture, energy, retail trade / other, and tourism sectors by distributing the additional personal vehicle trips to these categories using a weighted average of existing volumes of work-based and other home-based personal vehicle trips.

After all the additional indirect AADT is calculated, it is summed together with the opportunities AADT and then assumed to grow according to the baseline traffic growth rates (Section 4.4-4.5) from 2007 to 2036. This result is the overall two-lane AADT forecast.

(Model screenshot for illustration purposes only)

Figure 8: Two-Lane Forecasts, Overall Traffic Forecasts

ADT Calculations	Year	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2
	Year Index	0	1	2	3	4	5	6	7	8	9	10	11	12	
With IMPLAN Indirect Effects															
Truck Traffic															
Agriculture															
	MT 16	59.01	74.68	91.05	108.12	125.90	144.40	148.00	151.09	153.68	155.76	157.31	158.89	160.48	16
	US 2	53.53	63.15	89.50	110.60	132.44	155.04	162.79	166.03	168.77	171.00	172.71	174.43	176.18	17
	Overall	59.01	74.68	91.05	110.60	132.44	155.04	162.79	166.03	168.77	171.00	172.71	174.43	176.18	17
Energy															
	MT 16	42.00	62.18	85.42	111.56	140.90	173.76	193.93	215.08	237.76	262.12	288.04	317.17	348.89	38
	US 2	38.10	57.90	80.26	106.64	136.24	169.40	189.88	211.82	234.17	258.18	284.00	312.39	343.63	37
	Overall	42.00	62.18	85.42	111.56	140.90	173.76	193.93	215.08	237.76	262.12	288.04	317.17	348.89	38
Retail Trade / Other															
	MT 16	38.99	39.92	41.40	43.43	46.02	49.17	51.82	53.95	55.57	56.66	57.23	57.80	58.38	5
	US 2	35.37	36.26	37.70	39.70	42.25	45.36	47.97	50.07	51.65	52.70	53.23	53.76	54.30	5
	Overall	38.99	39.92	41.40	43.43	46.02	49.17	51.82	53.95	55.57	56.66	57.23	57.80	58.38	5
Personal Vehicle Traffic															
Work Based Trips															
	MT 16	461.29	2.96	5.84	8.48	10.91	13.20	14.19	14.79	15.19	15.43	15.51	15.59	15.67	1
	US 2	480.84	2.96	5.84	8.48	10.91	13.20	14.19	14.79	15.19	15.43	15.51	15.59	15.67	1
	MT 16	461.29	467.36	474.17	481.57	489.57	498.28	504.91	510.38	514.86	518.41	521.00	523.60	526.22	53
	US 2	480.84	487.00	493.92	501.41	509.51	518.32	525.05	530.62	535.21	538.85	541.55	544.25	546.98	54
	Overall	480.84	487.00	493.92	501.41	509.51	518.32	525.05	530.62	535.21	538.85	541.55	544.25	546.98	54
Tourism															
	MT 16	101.94	103.92	106.72	110.38	114.88	122.70	129.80	136.17	141.81	146.70	148.39	150.09	151.81	15
	US 2	106.26	110.74	116.09	122.31	129.40	139.85	147.15	153.72	159.56	164.65	166.54	168.45	170.38	17
	Overall	106.26	110.74	116.09	122.31	129.40	139.85	147.15	153.72	159.56	164.65	166.54	168.45	170.38	17
Other Home-Based Trips															
	MT 16	1135.77	7.31	14.48	21.07	27.15	32.94	35.54	37.18	38.33	39.10	39.46	39.83	40.20	4
	US 2	1183.91	7.63	15.13	22.02	28.39	34.46	37.18	38.90	40.10	40.91	41.29	41.67	42.06	4
	MT 16	1135.77	1154.47	1173.95	1193.76	1213.99	1234.87	1251.90	1267.29	1281.52	1294.67	1306.73	1318.90	1331.19	13
	US 2	1183.91	1203.37	1223.62	1244.19	1265.18	1286.80	1304.43	1320.37	1335.12	1348.80	1361.36	1374.04	1386.84	13
	Overall	1183.91	1203.37	1223.62	1244.19	1265.18	1286.80	1304.43	1320.37	1335.12	1348.80	1361.36	1374.04	1386.84	13
Total ADT															
	MT 16	1839.00	1902.53	1972.21	2048.80	2131.26	2223.18	2280.35	2333.97	2385.20	2434.32	2478.99	2526.45	2576.96	26
	(% Trucks)	7.51%	9.29%	11.04%	12.94%	14.69%	16.52%	17.27%	18.00%	18.74%	19.49%	20.25%	21.13%	22.93%	22
	US 2	1898.00	1964.43	2041.09	2124.84	2215.03	2314.77	2377.26	2432.63	2484.48	2534.18	2579.38	2627.34	2678.31	27
	(% Trucks)	6.53%	8.31%	10.16%	12.03%	14.04%	15.58%	16.05%	17.55%	18.38%	19.02%	19.77%	20.58%	21.44%	22
	Overall	1898.00	1964.43	2041.09	2124.84	2215.03	2314.77	2377.26	2432.63	2484.48	2534.18	2579.38	2627.34	2678.31	27
	(% Trucks)	7.38%	9.00%	10.67%	12.50%	14.42%	16.33%	17.18%	17.88%	18.68%	19.33%	20.09%	20.91%	21.78%	22

Figure 8 presents the model calculations for the overall two-lane traffic forecast by vehicle type, sector, and corridor segment.

5.2 Four-Lane Forecasts

A further traffic forecast was developed that assumes growth occurring if the current two-lane roadway were instead a four-lane highway.

This forecast was generated in the same manner as the overall two-lane forecast but some of the inputs take on different values than in the two-lane forecast. For example, the opportunity matrix uses sections specified for a four-lane roadway assumption, which generally results in either higher AADT expectations or a higher probability of an opportunity occurring.

The additional ADT (Section 4.8) assumed to be generated from opportunities not specifically listed in the opportunity matrix is also higher than in the two-lane case.

(Model screenshot for illustration purposes only)

Figure 9: Four-Lane Forecasts, Overall Traffic Forecasts

ADT Calculations	Year	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
	Year Index	0	1	2	3	4	5	6	7	8	9	10	11	12
4-Lane With IMPLAN Indirect Effects														
Truck Traffic														
Agriculture														
	MT 16	59.01	80.80	103.35	126.66	150.75	181.85	192.06	201.83	211.16	220.04	222.24	224.46	226.71
	US 2	53.53	75.27	101.80	129.14	157.29	191.92	205.68	215.01	223.90	232.33	234.65	237.00	239.37
	Overall	59.01	80.80	103.35	129.14	157.29	191.92	205.68	215.01	223.90	232.33	234.65	237.00	239.37
Energy														
	MT 16	42.00	64.38	90.04	118.84	151.11	187.20	208.70	231.33	255.64	281.79	309.97	340.96	375.06
	US 2	38.10	60.10	84.88	114.83	148.37	185.84	208.88	233.63	258.17	284.57	313.03	344.33	378.77
	Overall	42.00	64.38	90.04	118.84	151.11	187.20	208.88	233.63	258.17	284.57	313.03	344.33	378.77
Retail Trade / Other														
	MT 16	38.99	39.92	41.40	43.43	46.02	51.94	57.39	62.35	66.82	70.80	71.51	72.22	72.94
	US 2	35.37	36.26	37.70	39.70	42.25	45.36	47.97	50.07	51.65	52.70	53.23	53.76	54.30
	Overall	38.99	39.92	41.40	43.43	46.02	51.94	57.39	62.35	66.82	70.80	71.51	72.22	72.94
Personal Vehicle Traffic														
Work Based Trips														
	MT 16	461.29	3.86	7.45	10.70	13.64	16.53	17.72	18.51	19.07	19.47	19.57	19.66	19.76
	US 2	480.84	4.04	7.80	11.23	14.33	17.37	18.61	19.43	20.01	20.42	20.52	20.62	20.73
	MT 16	461.29	467.99	474.97	482.17	489.61	497.56	503.30	508.13	512.20	515.61	518.18	520.78	523.38
	US 2	480.84	487.81	495.07	502.54	510.24	518.44	524.33	529.29	533.49	537.00	539.69	542.38	545.10
	Overall	480.84	487.81	495.07	502.54	510.24	518.44	524.33	529.29	533.49	537.00	539.69	542.38	545.10
Tourism														
	MT 16	101.94	103.65	105.91	108.75	112.15	122.90	133.22	143.13	152.61	161.67	163.52	165.39	167.29
	US 2	106.26	114.08	122.54	131.63	141.37	158.52	169.25	179.57	189.47	198.95	201.23	203.54	205.87
	Overall	106.26	114.08	122.54	131.63	141.37	158.52	169.25	179.57	189.47	198.95	201.23	203.54	205.87
Other Home-Based Trips														
	MT 16	1135.77	9.54	18.46	26.59	33.97	41.27	44.38	46.53	48.11	49.32	49.78	50.24	50.71
	US 2	1183.91	9.98	19.33	27.89	35.68	43.36	46.61	48.84	50.48	51.72	52.20	52.69	53.18
	MT 16	1135.77	1156.43	1177.11	1197.65	1218.09	1252.09	1281.62	1309.88	1337.29	1364.02	1376.72	1389.55	1402.49
	US 2	1183.91	1205.45	1227.02	1248.44	1269.76	1291.62	1308.65	1324.25	1338.85	1352.63	1365.23	1377.95	1390.78
	Overall	1183.91	1205.45	1227.02	1248.44	1269.76	1291.62	1308.65	1324.25	1338.85	1364.02	1376.72	1389.55	1402.49
Total ADT														
	MT 16	1839.00	1913.18	1992.78	2077.50	2167.73	2293.53	2376.29	2456.64	2535.72	2613.92	2662.14	2713.37	2767.87
	(% Trucks)	7.61%	9.68%	11.78%	13.91%	16.05%	18.36%	19.28%	20.17%	21.04%	21.91%	22.68%	23.50%	24.38%
	US 2	1898.00	1978.97	2069.01	2166.28	2269.27	2391.70	2464.77	2531.83	2595.52	2658.18	2707.06	2758.96	2814.18
	(% Trucks)	6.63%	8.67%	10.84%	13.09%	15.33%	17.69%	18.77%	19.70%	20.56%	21.43%	22.20%	23.02%	23.89%
	Overall	1898.00	1978.97	2069.01	2166.28	2269.27	2391.70	2464.77	2531.83	2595.52	2658.18	2707.06	2758.96	2814.18
	(% Trucks)	7.38%	9.35%	11.35%	13.45%	15.62%	18.02%	19.15%	20.18%	21.15%	22.11%	22.97%	23.69%	24.56%

Figure 9 shows the model's generation of the overall four-lane traffic forecasts by vehicle type, sector, and corridor segment.

5.3 Peak Season Traffic Forecasts

Since there are certain times of the year, generally June through October, where overall traffic volumes are uncommonly high, we have also created forecasts of this "peak" season for traffic.

Peak season forecasts are calculated for both the two-lane case and for the four-lane alternative scenario by taking the overall final traffic values and multiplying them by the percent of traffic in peak season (Section 4.9). The peak season forecasts give an estimate of the potential worst case scenario for traffic congestion during each year in the forecast.

6: IMMEDIATE NEXT STEPS

This paper's purpose was to illustrate the methodology used in the forecasting modeling process and to present the model's input variables and their value ranges. The methodology presented was utilized within a risk analysis framework to create distributions of overall AADT and traffic distribution forecasts along a 30 year time horizon.

The next step is to produce a detailed analysis and presentation of the model's results. The results will be presented in the form of 30 year forecasts within an 80 percent confidence interval for both the two-lane and the four-lane scenarios for:

- Overall AADT on MT 16 and US 2;
- Percent Trucks on MT 16 and US 2;
- Peak Season AADT on MT 16 and US 2; and
- Peak Season Percent Trucks on MT 16 and US 2.

The presentation of these results will take the form of Working Paper #4.

APPENDIX A: LIST OF PANELISTS

This appendix provides a list of the panelists who participated in the RAP Session conducted on August 15, 2006.

NAME	AGENCY	PHONE NUMBER	EMAIL ADDRESS
Denver Tolliver	Upper Great Plains Transportation Institute, NDSU	701-231-7190	denver.tolliver@ndsu.edu
Martin Weiss	FHWA, DC	202-366-5010	martin.weiss@fhwa.dot.gov
Bryan Richards	Yanke Group, Saskatoon	306-664-1538	bryanr@yanke.ca
Linda Twitchell	Great Northern Development Corporation	406-653-2590	linda@gndc.org
Tod Kasten	Department of Commerce Board	406-485-3374	kranches@midrivers.com
Doug Smith	Sheridan County, Missouri River Country Tourism	406-765-3411	dsmith@co.sheridan.mt.us
Chet Hill	Williston Research Extension Center; MSU/NDSU Extension Service	701-774-4315 701-770-0144 (cell)	chill@ndsuext.nodak.edu chet.hill@ndsu.edu
Dick Iverson	Eastern Plains RC&D; NRCS - USDA	406-433-2103 x 125 406-489-7770 (cell)	richard.iversen@mt.usda.gov
Neil Turnbull	Sustainable Systems; Montola	406-787-6616 406-790-6616 (cell)	nturnbull@montola.com
Jim DeWitt	Dewitt Trucking	406-525-3293	jimsdew@yahoo.com
Bob Burkhardt	FHWA	406-449-5302 x 241	a0406@mt.gov bob.burkhardt@fhwa.dot.gov
Dick Turner	RTP; MDT Planning	406-444-7289	dturner@mt.gov
Hal Fossum	RTP; MDT Planning	406-444-6116	hfossum@mt.gov

NAME	AGENCY	PHONE NUMBER	EMAIL ADDRESS
Ray Mengel	District Administrator; MDT District IV	406-345-8212	rmengel@mt.gov
Khalid Bekka	HDR | HLB Decision Economics	240-485-2605	khalid.bekka@hdrinc.com
Stéphane Gros	HDR | HLB Decision Economics	240-485-2609	stephane.gros@hdrinc.com
Lynn Zanto	MDT Planning	406-444-3445	lzanto@mt.gov
Carl James	FHWA	406-449-5302	carl.james@fhwa.dot.gov
Sandy Straehl	MDT Planning	406-444-7692	sstraehl@mt.gov
Mike Duman	FHWA	406-449-5302 x 236	mike.duman@fhwa.dot.gov
Geoff Parkins	HDR	406-651-6610	geoff.parkins@hdrinc.com
Jan Brown	FHWA	406-449-2302	janice.brown@fhwa.dot.gov

APPENDIX B: RAP PRIMER

Economic forecasts traditionally take the form of a single "expected outcome" supplemented with alternative scenarios. The limitation of a forecast with a single expected outcome is clear -- while it may provide the single best statistical estimate, it offers no information about the range of other possible outcomes and their associated probabilities. The problem becomes acute when uncertainty surrounding the forecast's underlying assumptions is material.

A common approach is to create "high case" and "low case" scenarios to bracket the central estimate. This scenario approach can exacerbate the problem of dealing with risk because it gives no indication of likelihood associated with the alternative outcomes. The commonly reported "high case" may assume that most underlying assumptions deviate in the same direction from their expected value, and likewise for the "low case." In reality, the likelihood that all underlying factors shift in the same direction simultaneously is just as remote as that of everything turning out as expected.

Another common approach to providing added perspective on reality is "sensitivity analysis." Key forecast assumptions are varied one at a time in order to assess their relative impact on the expected outcome. A problem here is that the assumptions are often varied by arbitrary amounts. A more serious concern with this approach is that, in the real world, assumptions do not veer from actual outcomes one at a time. It is the impact of simultaneous differences between assumptions and actual outcomes that is needed to provide a realistic perspective on the risk levels of a forecast.

Risk Analysis provides a way around the problems outlined above. It helps avoid the lack of perspective in "high" and "low" cases by measuring the probability or "odds" that an outcome will actually materialize. This is accomplished by attaching ranges (probability distributions) to the forecasts of each input variable. The approach allows all inputs to be varied simultaneously within their distributions, thus avoiding the problems inherent in conventional sensitivity analysis. The approach also recognizes interrelationships between variables and their associated probability distributions.

The Risk Analysis Process involves four steps:

Step 1: Define the structure and logic of the forecasting problem;

Step 2: Assign estimates and ranges (probability distributions) to each variable and forecasting coefficient in the forecasting structure and logic;

Step 3: Engage experts and stakeholders in assessment of model and assumption risks (the "RAP Session"); and

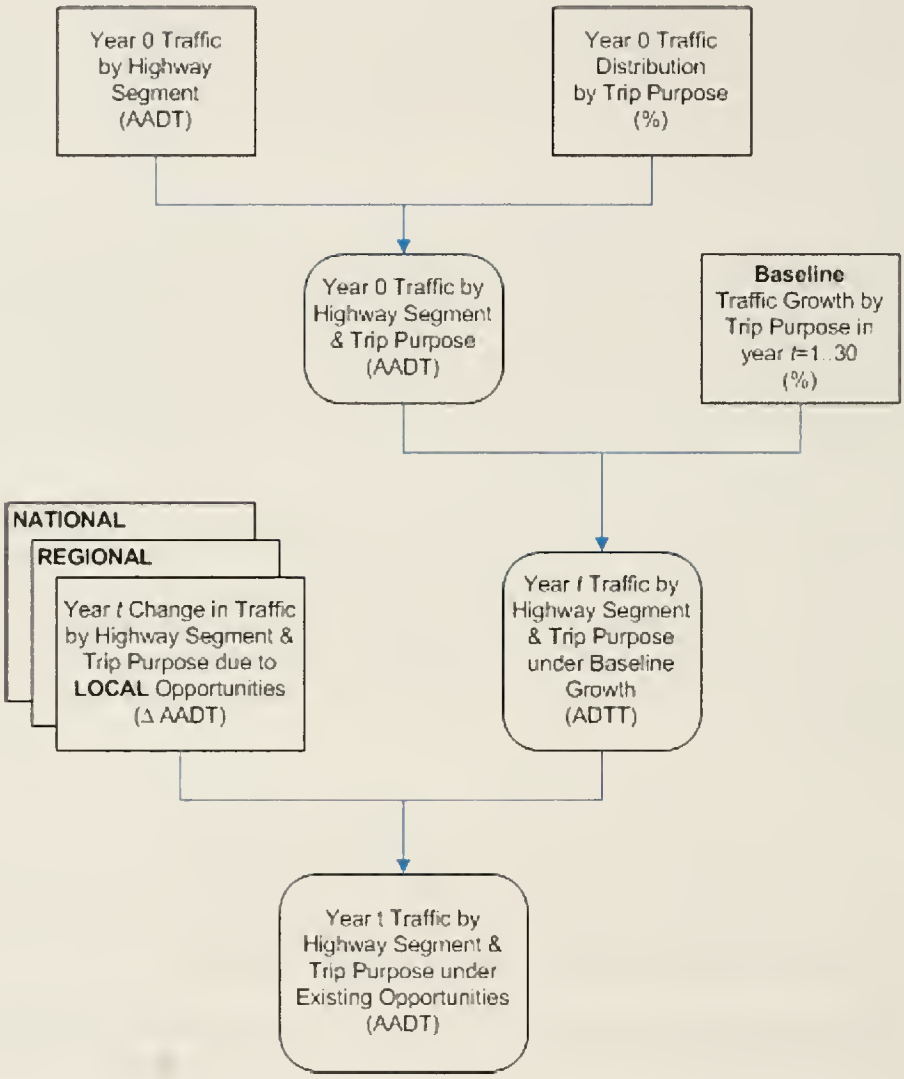
Step 4: Issue forecast risk analysis.

Step 1: Define Structure and Logic of the Forecasting Problem

A "structure and logic model" depicts the variables and cause and effect relationships that underpin the forecasting problem at-hand (Figure 6).

Although the structure and logic model is written down mathematically to facilitate analysis, it is also depicted diagrammatically in order to permit stakeholder scrutiny and modification in Step 3 of the process (see below).

Figure 10: Example of Structure and Logic Model, *an Illustration*



Step 2: Assign Central Estimates and Conduct Probability Analysis

Each variable is assigned a central estimate and a range (a probability distribution) to represent the degree of uncertainty. Special data sheets are used (see Figure 7) to record the estimates. The first column gives an initial median while the second and third columns define an uncertainty range representing an 80 percent confidence interval. This is the range within which there exists an 80 probability finding the actual outcome. The greater the uncertainty associated with a forecast variable the wider the range.

Figure 11: Data Sheet for General Price Inflation, *an Illustration*

Variable	Median	Lower 10% Limit	Upper 10% Limit
Baseline Traffic Growth (2006-2010)	1.0%	0.5%	2.0%

Probability ranges are established on the basis of both statistical analysis and subjective probability. Probability ranges need not be normal or symmetrical -- that is, there is no need to assume the bell shaped normal probability curve. The bell curve assumes an equal likelihood of being too low and being too high in forecasting a particular value. It might well be, for example, that if a projected growth rate deviates from expectations, circumstances are such that it is more likely to be higher than the median expected outcome than lower.

The RAP computer program transforms the ranges as depicted above into formal probability distributions (or "probability density functions"). This liberates the non-statistician from the need to appreciate the abstract statistical depiction of probability and thus enables stakeholders to understand and participate in the process whether or not they possess statistical training.

From where do the central estimates and probability ranges for each assumption in the forecasting structure and logic framework come? There are two sources. The first is an historical analysis of statistical uncertainty in all variables and an error analysis of the forecasting "coefficients." "Coefficients" are numbers that represent the measured impact of one variable (say, income) on another (such as retail sales). While these coefficients can only be known with uncertainty, statistical methods help uncover the magnitude of such error (using diagnostic statistics such as "standard deviation," "standard error," "confidence intervals" and so on).

The uncertainty analysis outlined above is known in the textbooks as "frequentist" probability. The second line of uncertainty analysis employed in risk analysis is called "subjective probability" (also called "Bayesian" statistics, for the mathematician Bayes who developed it). Whereas a frequentist probability represents the measured frequency with which different outcomes occur (i.e., the number of heads and tails after thousands of tosses) the Bayesian probability of an event occurring is the degree of belief held by an informed person or group that it will occur. Obtaining subjective probabilities is the subject of Step 3.

Step 3: Conduct Expert Evaluation: The RAP Session

Step 3 involves the formation of an expert panel and the use of facilitation techniques to elicit, from the panel, risk and probability beliefs about:

1. The structure of the forecasting framework; and

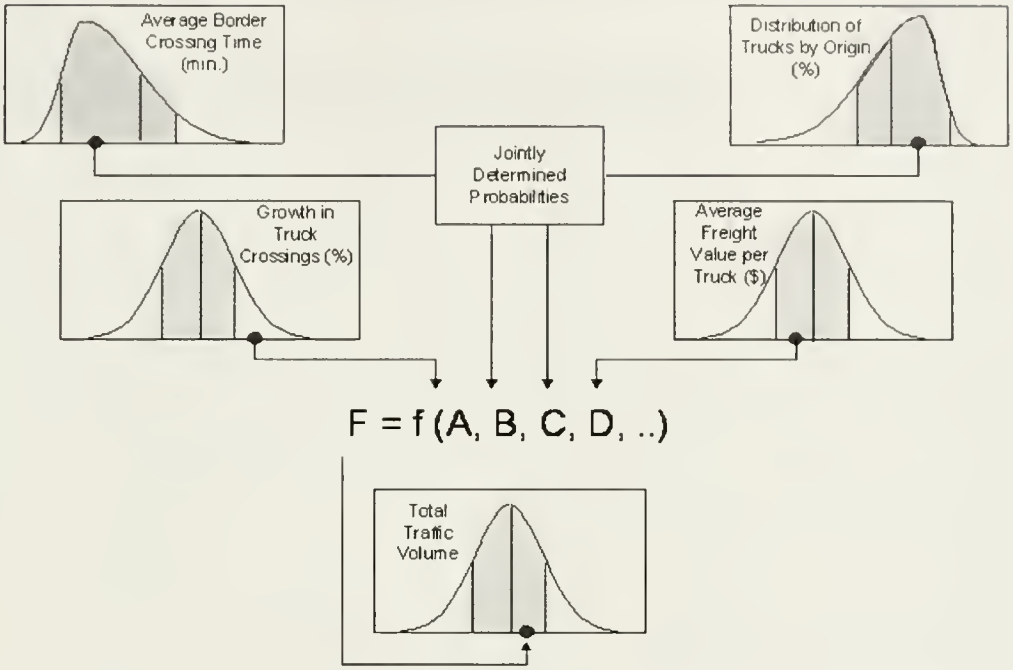
2. Uncertainty attaching to each variable and forecasting coefficient within the framework.

In (1), experts are invited to add variables and hypothesized causal relationships that may be material, yet missing from the model. In (2), panelists are engaged in a discursive protocol during which the frequentist-based central estimates and ranges, provided to panelists in advance of the session, are modified according to subjective expert beliefs. This process is aided with an interactive "groupware" computer tool that permits the visualization of probability ranges under alternative belief systems.

Step 4: Issue Risk Analysis

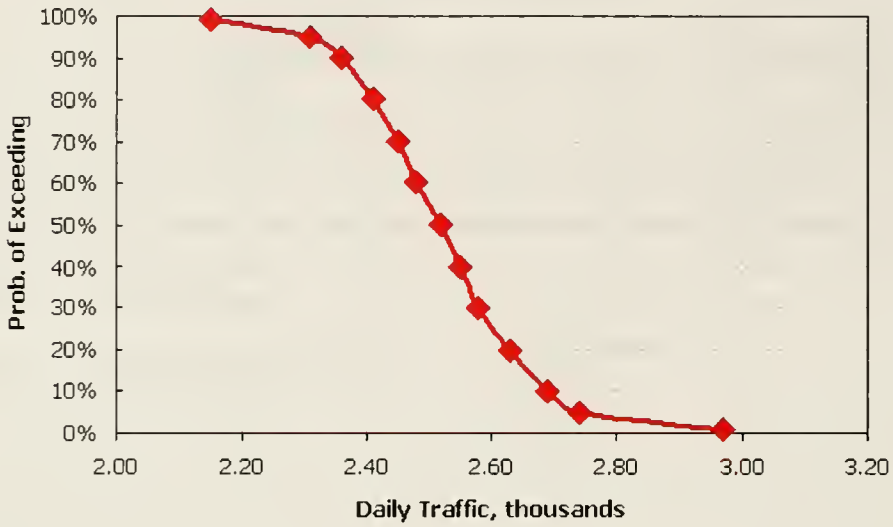
The final probability distributions are formulated by the risk analyst (HDR | HLB) and represent a combination of "frequentist" and subjective probability information drawn from Step 3. These are combined using a simulation technique (Monte Carlo analysis) that allows each variable and forecasting coefficient to vary simultaneously according to its associated probability distribution (see Figure 8, below).

Figure 12: Combining Probability Distributions, *an Illustration*



The end result is a central forecast, together with estimates of the probability of achieving alternative outcomes given uncertainties in underlying variables and coefficients (see Figure 9 and Table 1, below).

Figure 13: Risk Analysis of Future Corridor Traffic and Percentage of Trucks in Total Traffic, *an Illustration*



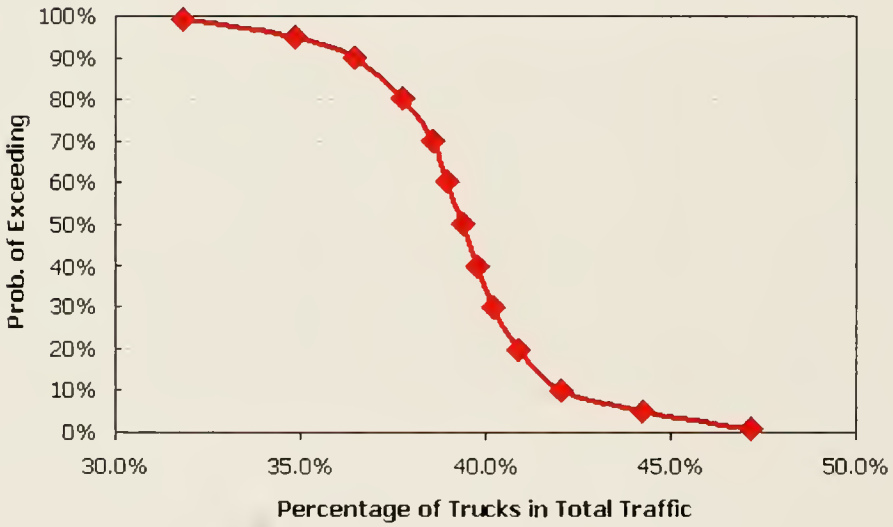


Table 1: Risk Analysis of Future Corridor Traffic and Percentage of Trucks in Total Traffic, *an Illustration*

Future Corridor Traffic, thousands	Probability of Exceeding Value Shown at Left
2.15	99%
2.31	95%
2.36	**90%**
2.41	80%
2.45	70%
2.48	60%
2.52	**50%**
2.55	40%
2.58	30%
2.63	20%
2.69	**10%**
2.74	5%
2.97	1%
2.56	**Mean Expected Outcome**

Percentage of Trucks in Total Traffic, %	Probability of Exceeding Value Shown at Left
31.8%	99%
34.8%	95%
36.5%	**90%**
37.8%	80%
38.6%	70%
39.0%	60%
39.4%	**50%**
39.8%	40%
40.2%	30%
40.9%	20%
42.0%	**10%**
44.3%	5%
47.2%	1%
39.1%	**Mean Expected Outcome**

APPENDIX C: SUPPORTING DATA

Table 2: Historical Traffic Counts along the Project Corridor

Segment	2002		2003		2004		2005	
	Car	Truck	Car	Truck	Car	Truck	Car	Truck
1) Raymond to Plentywood (MT-16)	940	80	940	92	1,140	106	1,140	104
2) Plentywood to Antelope (MT-16)	3,596	186	2,970	186	4,180	185	3,945	186
3) Antelope to Medicine Lake (MT-16)	990	144	970	143	1,090	144	1,360	144
4) Medicine Lake to Culbertson (MT-16)	1,165	183	870	156	1,004	144	1,349	143
5) Culbertson to Bainville (US-2)	1,905	126	1,800	126	2,140	127	2,140	127
6) Bainville to North Dakota Border (US-2)	1,212	126	1,100	127	1,325	127	1,330	127

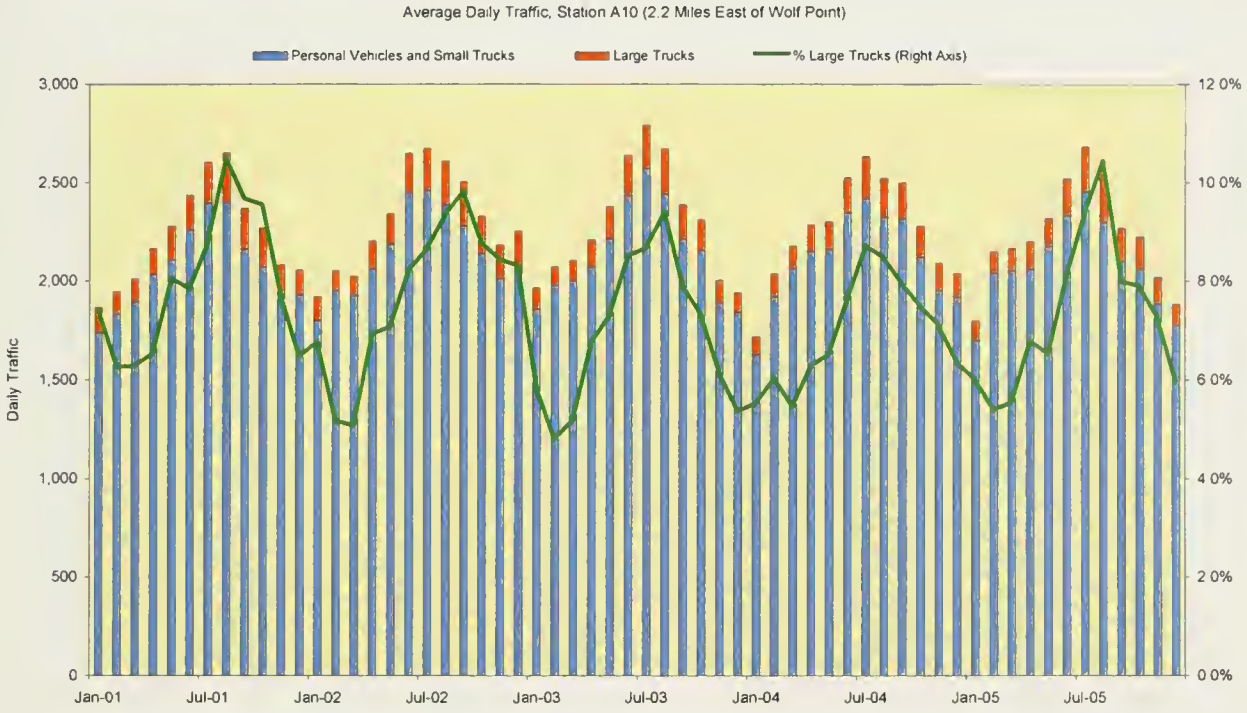
Source: Temporary Traffic Data Recorders

Table Cont': Average Growth per Year along the Project Corridor, 2002-2005

Segment	Growth 2002-2005		
	Cars	Trucks	Overall
1) Raymond to Plentywood (MT-16)	7%	9%	**7%**
2) Plentywood to Antelope (MT-16)	3%	0%	**3%**
3) Antelope to Medicine Lake (MT-16)	11%	0%	**10%**
4) Medicine Lake to Culbertson (MT-16)	5%	-8%	**3%**
5) Culbertson to Bainville (US-2)	4%	0%	**4%**
6) Bainville to North Dakota Border (US-2)	3%	0%	**3%**

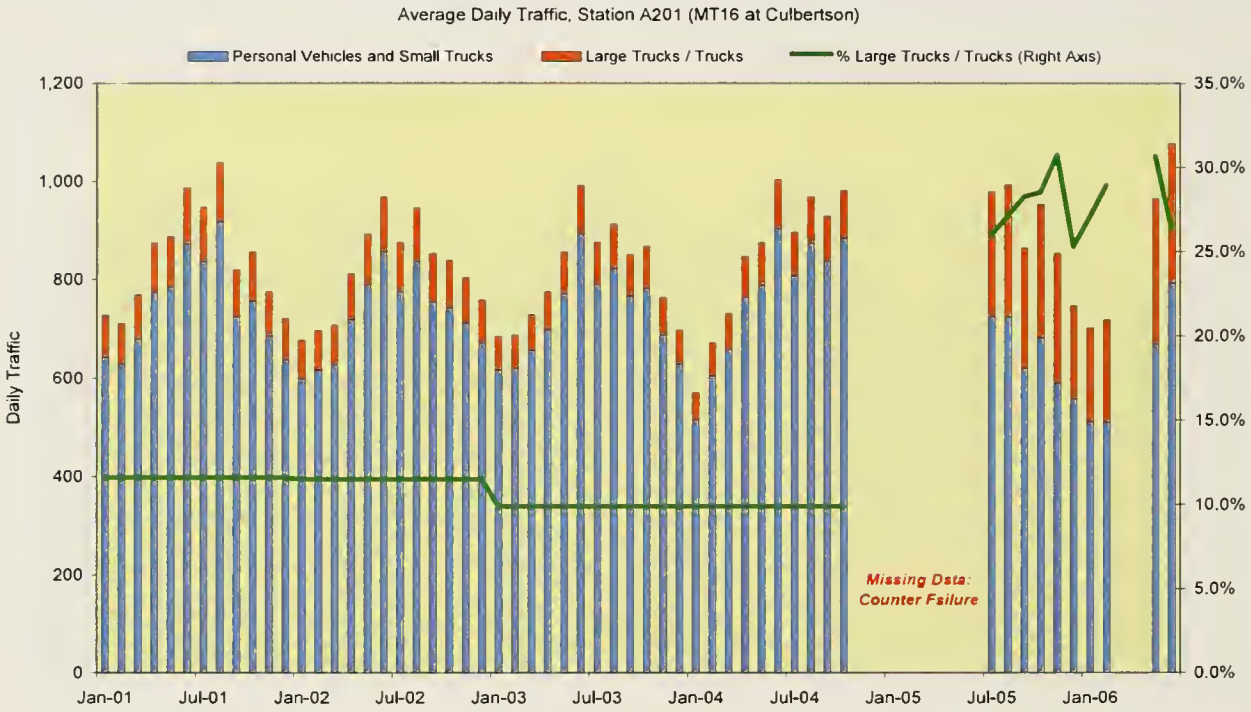
Source: Temporary Traffic Data Recorders

Figure 14: Average Daily Traffic Counts on US 2 at Wolf Point, January 2001 – December 2005



Source: MDT Automatic Traffic Recorders

Figure 15: Average Daily Traffic Counts on MT 16 at Culbertson, January 2001 – June 2006



Source: MDT Automatic Traffic Recorders; http://www.mdt.mt.gov/publications/datastats.shtml
Note: Monthly vehicle distribution (personal vehicles vs. large trucks) not available before 2005. Change in data sources and variable definition (all vs. large trucks) may explain the jump in truck percentage after July 2005. Data after 2005 is for East lane only; multiplied by two to obtain two-way

AADT comparable to pre-2005 data.

Working Paper #4:

Model Results

Montana Department of Transportation

TRANSPORTATION REGIONAL ECONOMIC DEVELOPMENT

TRED

THEODORE ROOSEVELT EXPRESSWAY

Working Paper #4: Model Results

Final

Prepared by:

HDR | HLB Decision Economics Inc.
8403 Colesville Road, Suite 910
Silver Spring, Maryland 20910
Tel: (240) 485-2600
Fax: (240) 485-2635

April 2007

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1 INTRODUCTION

This Working Paper is part of the US 2/MT 16 Theodore Roosevelt Expressway Development Study. The purpose of the study is to identify the economic, regulatory, or operational changes that would result in traffic and safety conditions justifying the expansion of the Theodore Roosevelt Expressway section in Montana to a four-lane facility.

This Working Paper provides a detailed presentation and analysis of the traffic forecasting model's results. The paper is a continuation of the TRED Working Paper series and, specifically, is a direct extension of Working Paper #3, Methodological Framework. Within this paper the reader will find forecasts of overall average annual daily traffic (AADT) and the percentage of this overall AADT that can be attributed to large truck traffic along the Theodore Roosevelt Expressway's sections of MT 16 and US 2 that lie within the State of Montana. These forecasts will be presented first as mean expected outcomes and then within a risk analysis framework.

The results presented in this Working Paper utilize input assumptions designed to forecast long-term average traffic volumes along the study area corridor. By focusing on long-term averages, any short-term fluctuations due to such events as economic booms, recessions, or droughts are evened out over time. Therefore, the research team believes the forecasting results generated by this modeling process are neither overly optimistic nor pessimistic in nature.

After this introductory chapter, Chapter 2 provides mean expected outcomes of the model results. Chapter 3 then presents the risk analysis results and Chapter 4 provides a summary of the findings and conclusions that the results support. Analysis of safety performance along the corridor, taking into account the model's forecasts, will be detailed in a forthcoming document.

The traffic forecasting results presented in this paper were developed specifically for the study area corridor and, therefore, should not be considered applicable to other corridors in Montana.

2 MEAN EXPECTED OUTCOMES

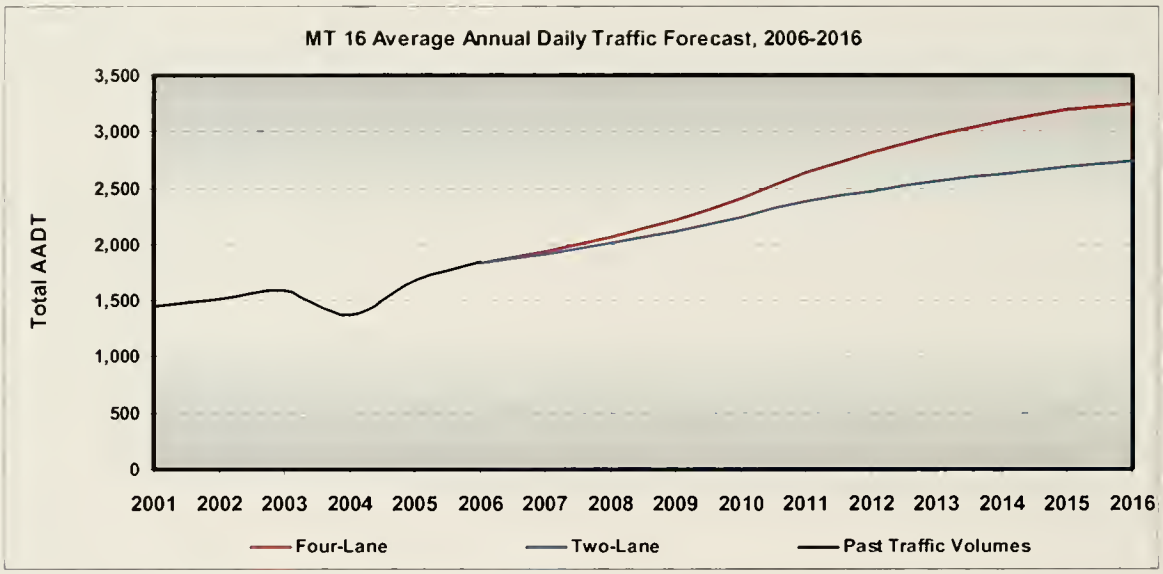
This section presents the mean expected outcomes of the model's forecasts for overall traffic volumes and the percentage of traffic attributable to trucks over the next 30 years.

2.1 Near-Term Forecasts

The following forecasts represent the expected levels of AADT and percentage of overall traffic attributable to large trucks from 2006 to 2016, a 10 year[1] forecast horizon.

Figure 1 below presents the expected AADT (number of vehicles) for MT 16 for both the base case of a two-lane corridor and for the alternative four-lane highway expansion. Both forecasts include the mean expected outcomes calculated with the itemized traffic opportunities and indirect employment effects, while the four-lane forecast further includes the induced traffic due to a four-lane expansion.

Figure 1

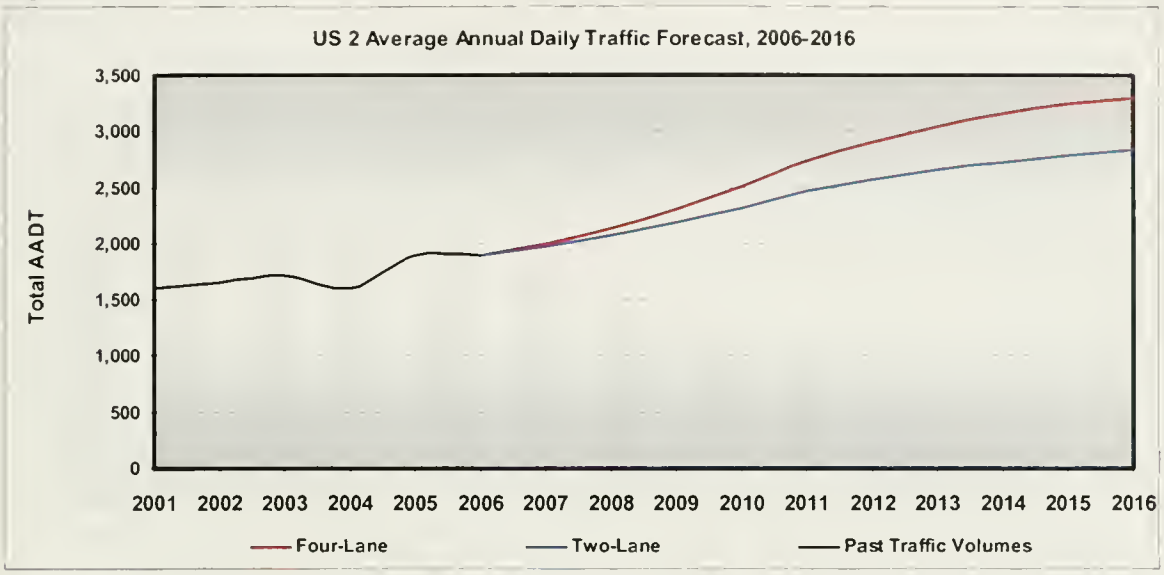


MT 16 10-Year AADT Forecast, Mean Expected Outcomes

[1] Although there are 11 years within the period 2006-2016, there are only 10 forecast years; since 2006 values are assumed known and therefore do not represent a forecast.

Similarly, Figure 2 includes the expected AADT (number of vehicles) forecast for US 2 under both the current two-lane configuration and with a four-lane corridor expansion.

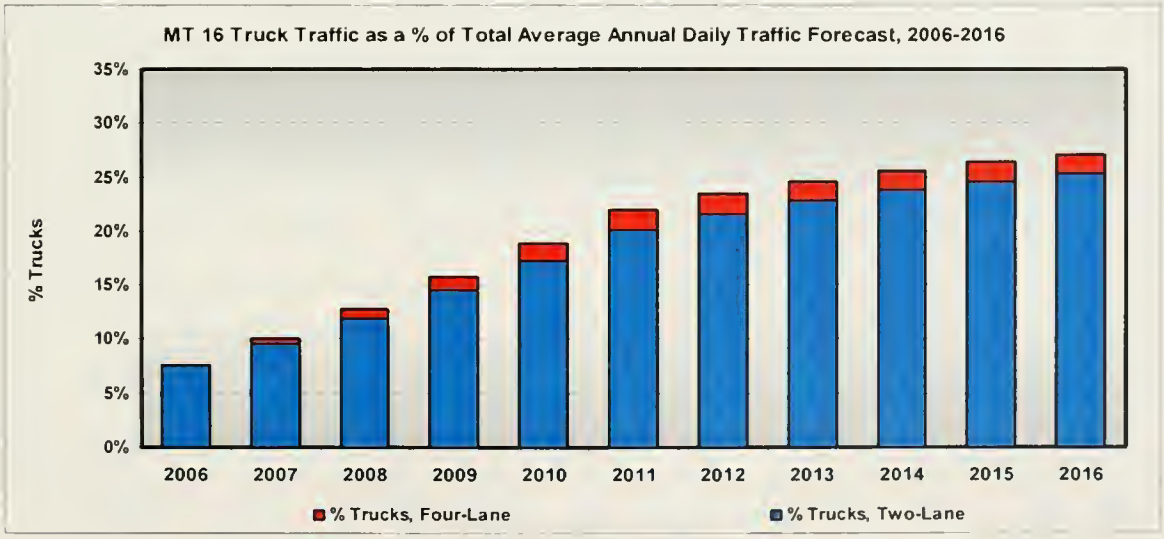
Figure 2



US 2 10-Year AADT Forecast, Mean Expected Outcomes

The expected ratio of truck traffic to overall traffic is presented in Figure 3. Because of high expected growth in the volume of truck traffic as compared to personal vehicle traffic, the percentage of total AADT that is attributed to trucks grows quite vigorously over time. As can be seen the four-lane expansion would be expected to have a slightly higher percentage of trucks than the current two-lane corridor.

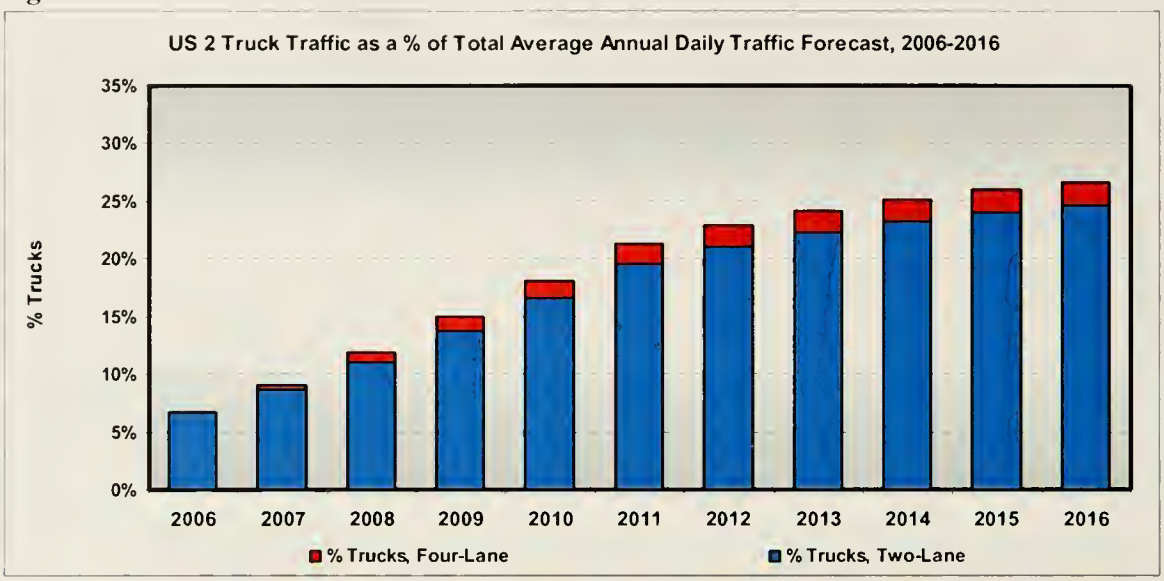
Figure 3



MT 16 10-Year Percentage of AADT, Trucks; Mean Expected Outcome

As illustrated in Figure 4 below, the expected growth in the ratio of truck traffic to overall traffic is also very large along the US 2 corridor.

Figure 4



US 2 10-Year Percentage of AADT, Trucks; Mean Expected Outcomes

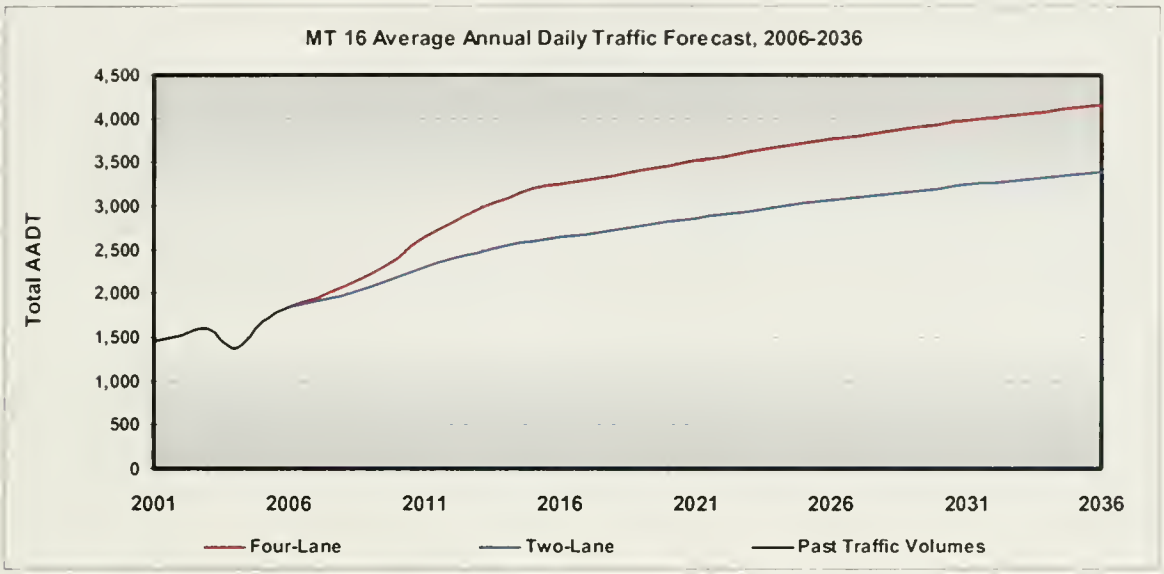
2.2 Long-Term Forecasts

The following forecasts now assume a 30 year time horizon and represent the mean expected outcomes for both AADT and the percentage of total AADT attributable to truck traffic in each year for both MT 16 and US 2[2] under the two-lane base case and under a four-lane corridor expansion scenario.

[2] Mean expected traffic volume forecasts for MT 16 and US 2 illustrating ADT due to historical growth rates and additional growth due to opportunities, separately, are shown in Appendix A

Figure 5 illustrates the mean expected growth of traffic for MT 16 over the next 30 years for both the two-lane and four-lane scenarios. As can be seen, AADT is expected to double under the two-lane corridor scenario and more than double over 30 years if the corridor were expanded to four-lanes.

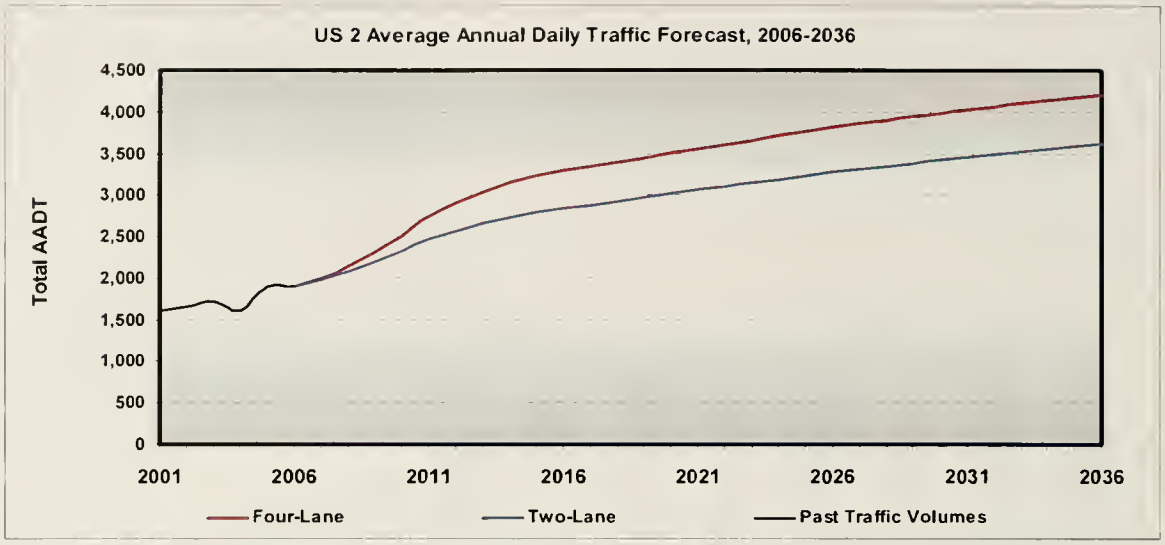
Figure 5



MT 16 30-Year AADT Forecast, Mean Expected Outcomes

Figure 6 shows the mean expected results for US 2 over the next 30 years. Growth is very similar to that expected for MT 16 with US 2 AADT being only slightly higher than that expected for MT 16, for both the two-lane and four-lane scenarios.

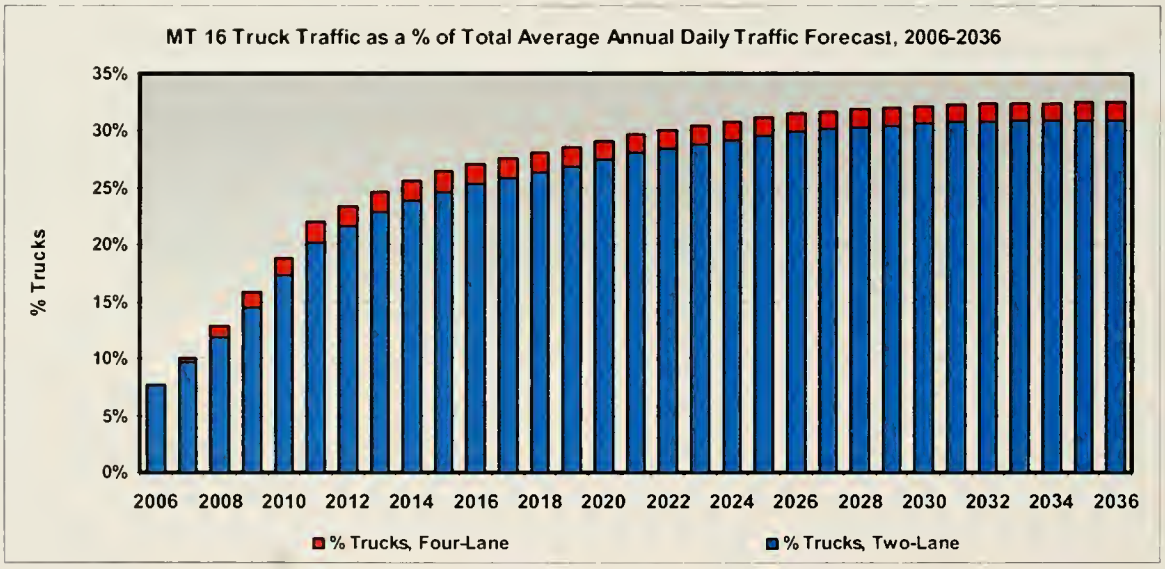
Figure 6



US 2 30-Year AADT Forecast, Mean Expected Outcomes

Figure 7 presents the mean expected percentage of overall traffic that can be attributed to trucks for MT 16 over the next 30 years. As can be seen the growth in truck traffic is expected to lead to over 30% trucks in the overall traffic stream in both the two-lane and four-lane scenarios.

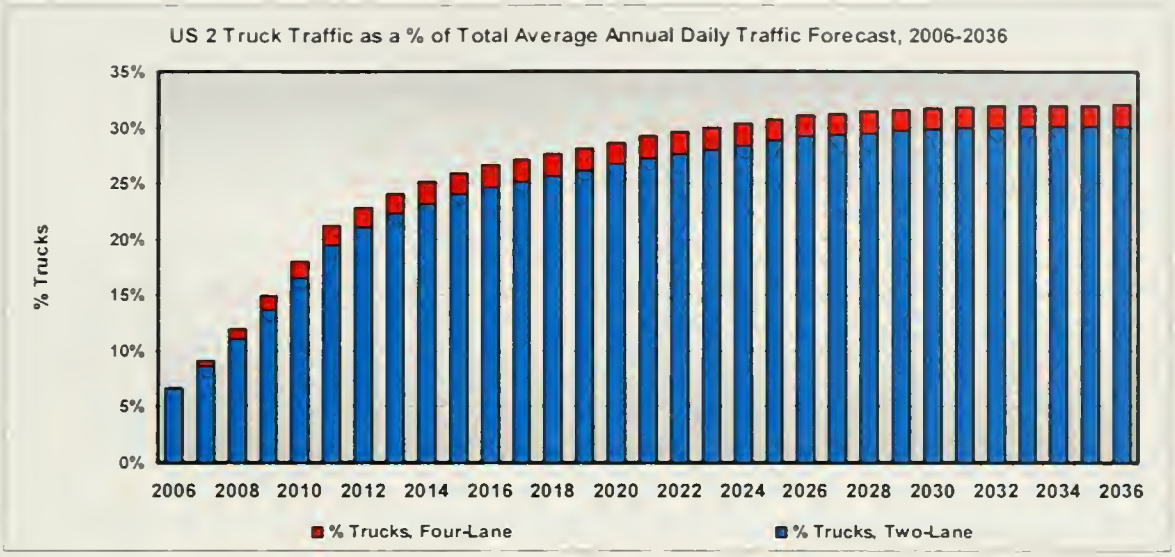
Figure 7



MT 16 30-Year Percentage of AADT, Trucks; Mean Expected Outcomes

Figure 8 illustrates the expected percentage of truck traffic along US 2 over the next 30 years. The results are very similar to those for MT 16, though the overall percentage of trucks in the traffic stream along US 2 is expected to be slightly lower than that for MT 16 over the forecast horizon.

Figure 8



US 2 30-Year Percentage of AADT, Trucks; Mean Expected Outcomes

To summarize, both the MT 16 and US 2 sections of the TRE corridor are expected to experience similar growth in both overall AADT and in the percentage of trucks along the corridors over the next 30 years in both the two-lane and four-lane scenarios. However, MT 16 is expected to have a slightly higher percentage of truck traffic than the US 2 section of the corridor for both the two-lane and four-lane scenarios. The US 2 section is expected to have slightly higher overall AADT than the MT 16 corridor in both the two-lane and four-lane scenarios.

3 RISK ANALYSIS RESULTS

This section presents the results of the forecasting model within a risk analysis framework. Specifically, 80% confidence intervals were calculated and the results are presented for each forecast.

3.1 Risk Analysis of AADT Growth

In this report, confidence intervals take the form of a central estimate that represents the median[3] level bounded above and below by an upper and a lower bound. Within an 80% confidence interval the upper bound represents values where any values higher than those that lie along that upper bound have only a 10% chance of occurring. Similarly, the lower bound represents values where any values lower than those that lie along the lower bound have only a 10% chance of occurring. This means that the probability that a value lies below the upper bound and above the lower bound is 80%.

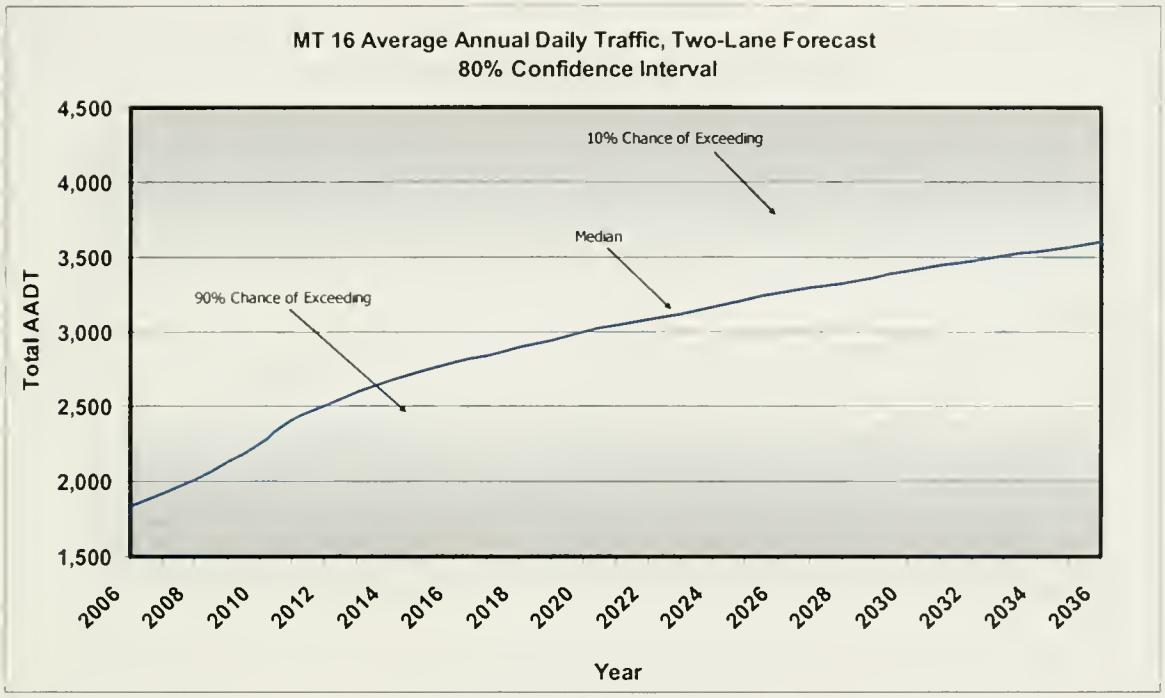
3.1.1 Two-Lane Forecasts

This section presents forecasts within a risk analysis framework for overall AADT for both the MT 16 and US 2 sections of the TRE corridor, assuming these sections remain two-lanes over the next 30 years.

[3] A median value represents a true central value that is defined in such a way that any value above the median has a 50% chance of occurrence; likewise any value below the median value also has a 50% chance of occurrence.

Figure 9 represents an 80% confidence interval forecast for the overall AADT along the MT 16 section of the study area corridor over the next 30 years. As can be seen in the chart, there is a 50% (median) chance that AADT will reach approximately 3,600 vehicles in 2036, and a 10% chance that overall AADT will grow to about 4,300 vehicles by the same year. Similarly, there is a 10% chance that the number of vehicles will only reach approximately 3,100 in 30 years.

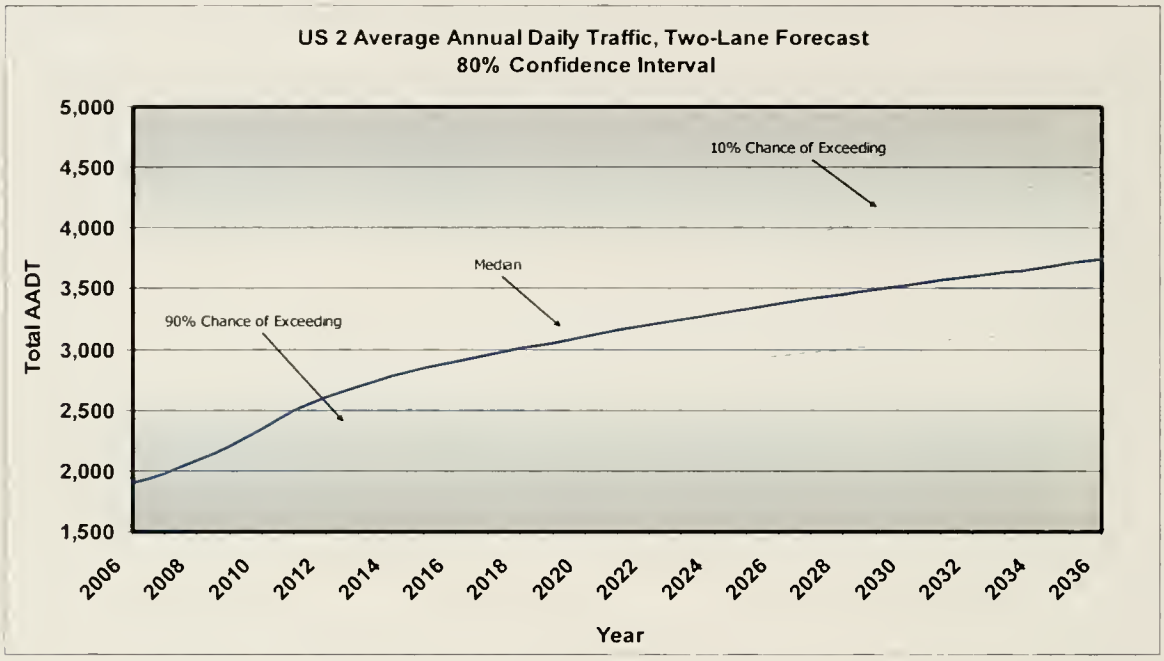
Figure 9



MT 16 30-Year AADT Forecasts, 80% Confidence Interval Two-Lane Outcomes

Figure 10 illustrates the risk analysis AADT forecast results for the US 2 section of the study area corridor for the next 30 years assuming it remains at two-lane capacity. The results are very similar to those presented above for the MT 16 section. Overall AADT has a 50% chance of reaching about 3,700 vehicles in 2036, while there is a 10% chance the AADT will be approximately 4,500. There is also a 10% chance that AADT will only grow to about 3,200 vehicles in the next 30 years.

Figure 10



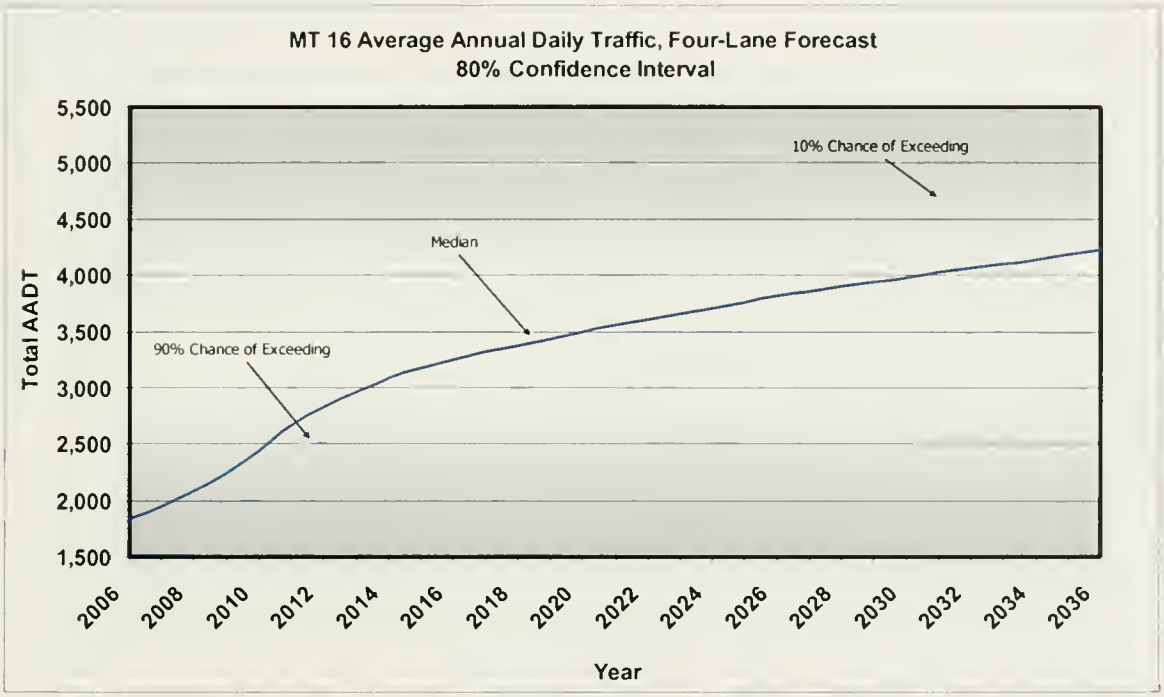
US 2 30-Year AADT Forecasts, 80% Confidence Interval Two-Lane Outcomes

3.1.2 Four-Lane Forecasts

In this section, risk analysis forecasts for overall AADT on the MT 16 and US 2 sections of the study area corridor are presented under the assumption that these sections have been expanded to four-lane capacity.

Figure 11 illustrates the AADT risk analysis results for the MT 16 section of the study area corridor for the next 30 years, assuming the roadway was expanded to a four-lane capacity. As can be seen, there is a 50% (median) chance that AADT will reach about 4,250 in 2036, while there is a 10% chance that AADT will grow to approximately 5,000 in 30 years. There is also a 10% chance that AADT will only grow to about 3,600 within the next 30 years.

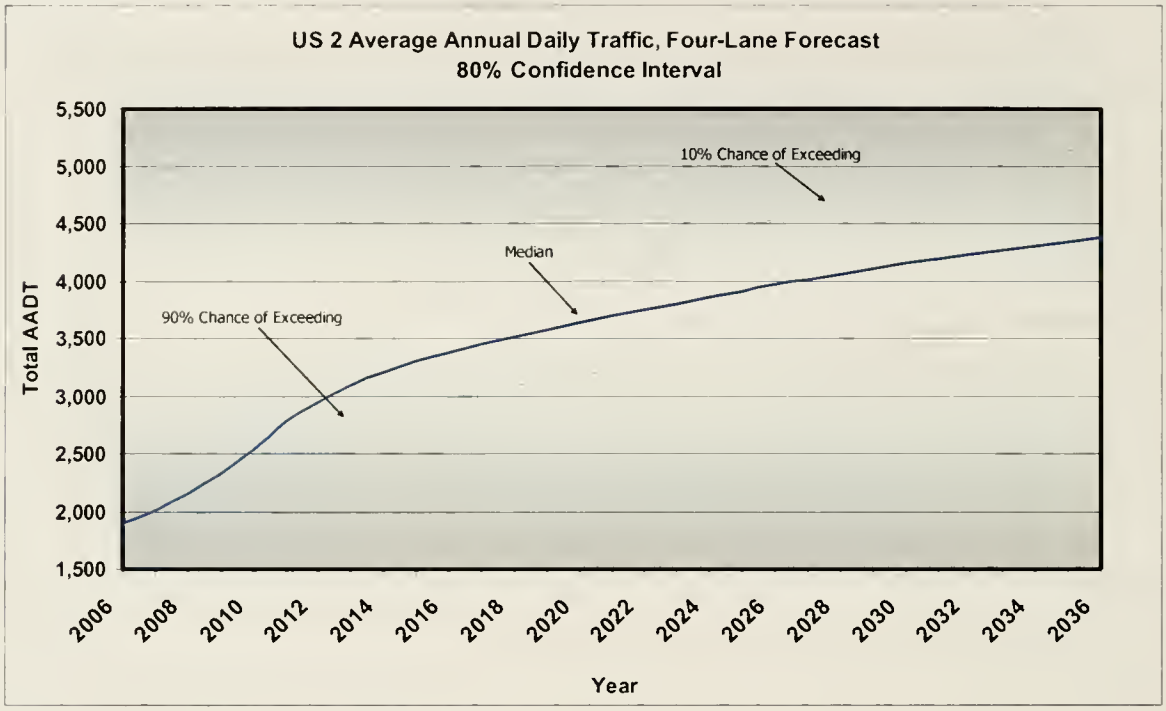
Figure 11



MT 16 30-Year AADT Forecasts, 80% Confidence Interval Four-Lane Outcomes

Figure 12 shows the risk analysis forecast for AADT along the US 2 section of the TRE corridor for the next 30 years. The results are very similar to those already presented for the MT 16 section, though AADT is projected to be slightly higher on the US 2 section. There is a 50% (median) chance AADT will grow to about 4,400 vehicles by 2036, while there is a 10% chance that AADT will be approximately 5,200 by that year. On the lower end, there is a 10% chance that AADT will only reach about 3,700 within 30 years.

Figure 12



US 2 30-Year AADT Forecasts, 80% Confidence Interval Four-Lane Outcomes

3.1.3 Peak Season Forecasts

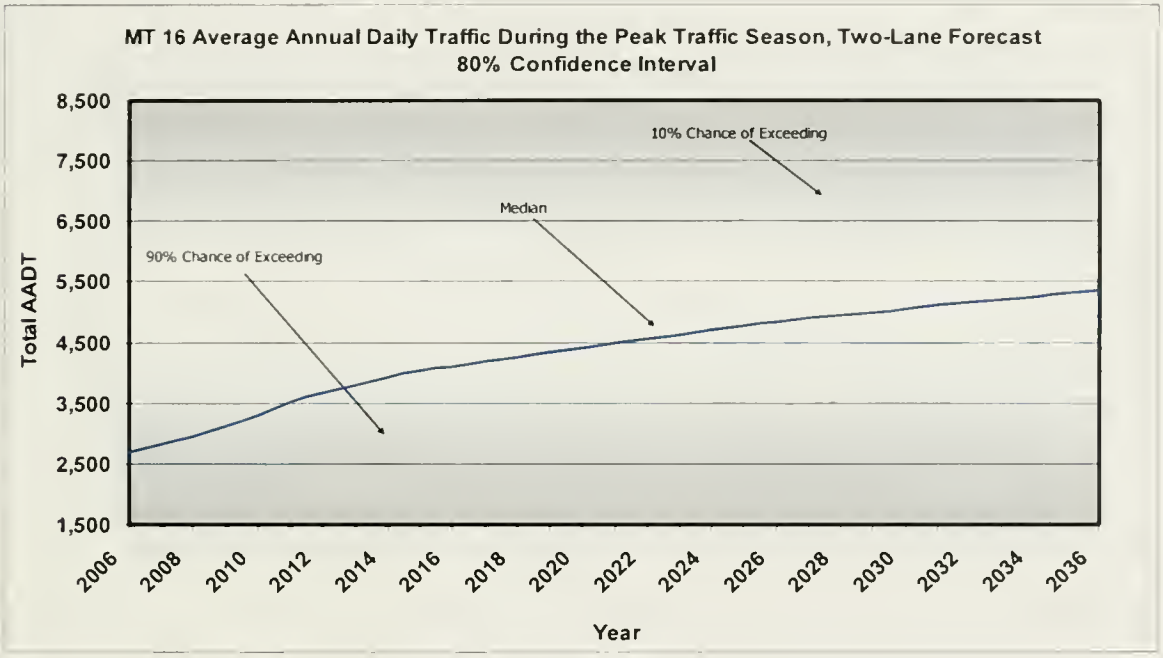
There are times of the year when traffic volumes are inordinately high compared to the average annual daily rate. These times are referred to as the peak season for traffic and can be the result of many factors, such as, transport seasonality of agricultural crops to market or an increase in tourism trips due to prime vacation season. For the purposes of this analysis the peak season can be defined generally as the months of June through October of each year. This section presents the risk analysis AADT forecast results for both the MT 16 and US 2 sections of the study area corridor for the next 30 years during the peak traffic season.

3.1.3.1 Two-Lane Forecasts

Peak season forecasts for both MT 16 and US 2 assuming that the roadway corridors remain at two-lane capacities over the next 30 years are illustrated in the next two figures.

Figure 13 represents an 80% confidence interval for MT 16 projected peak season AADT, assuming a two-lane corridor. According to the chart, there is a 50% chance of traffic reaching about 5,400 vehicles per day in 2036, and a 10% chance of the AADT growing to approximately 7,500 by that same year. There is also a 10% chance that peak season AADT will only be about 3,800 within 30 years.

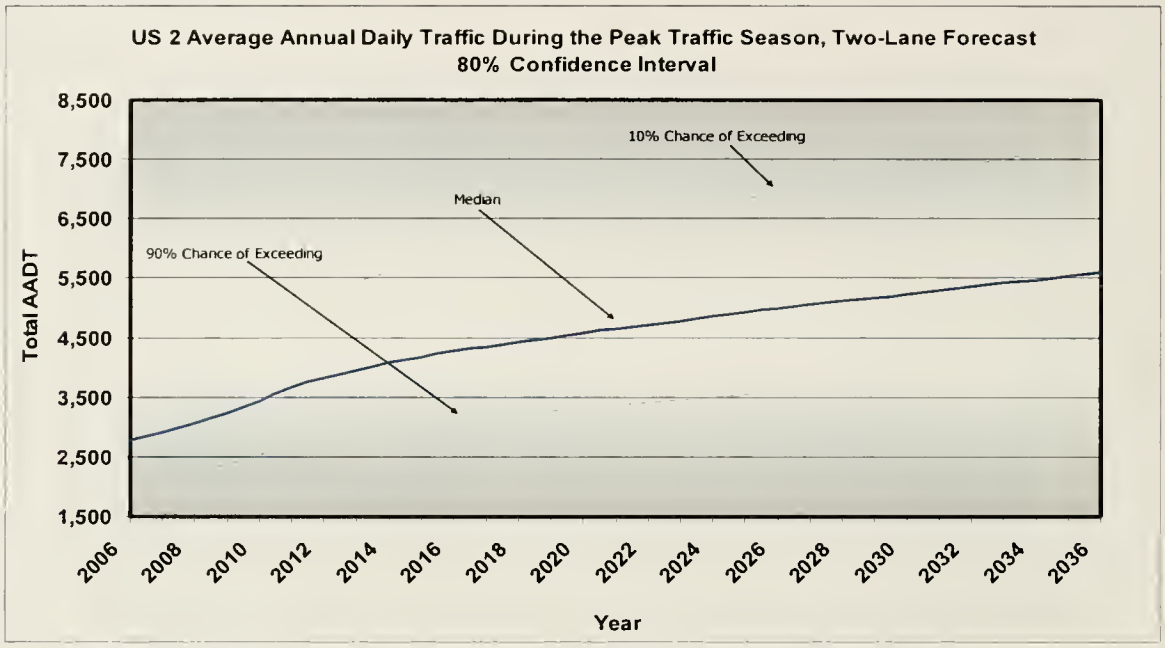
Figure 13



MT 16 30-Year Peak Season AADT Forecasts, 80% Confidence Interval Two-Lane Outcomes

According to Figure 14, median AADT along the US 2 section of the study area corridor during the peak season is projected to surpass 5,600 by 2036. There is also a 10% chance that peak season AADT would reach 7,700 in 2036. However, there is also a 10% chance that the peak season AADT would only grow to 4,000 vehicles within the next 30 years.

Figure 14



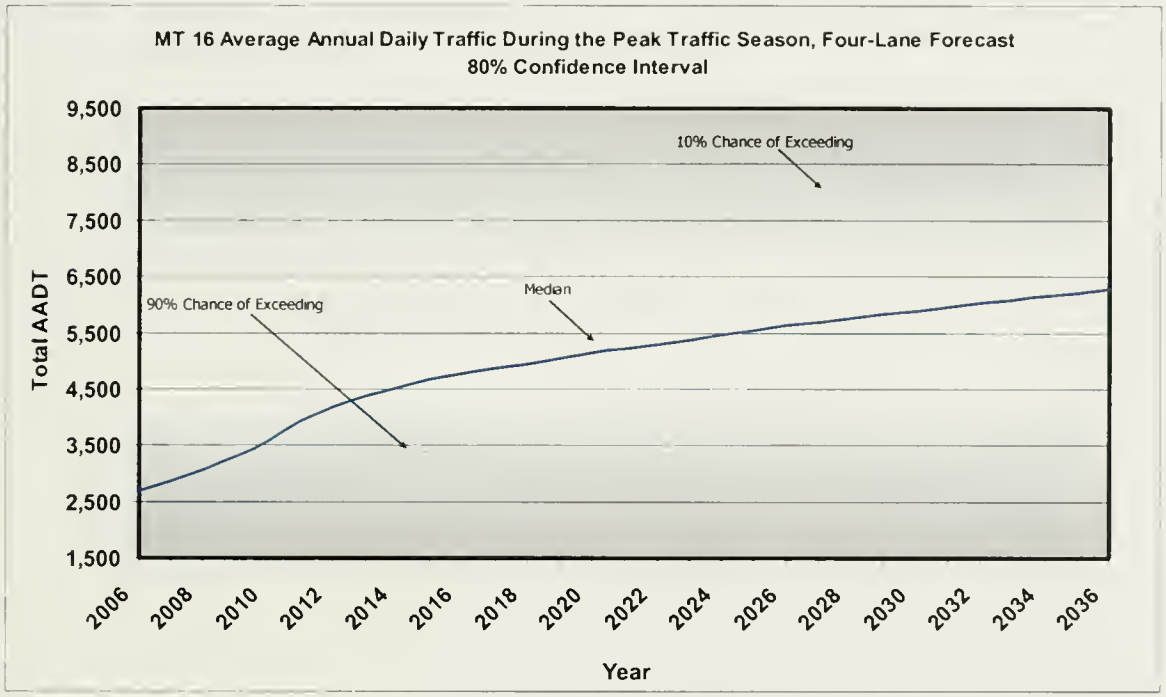
US 2 30-Year Peak Season AADT Forecasts, 80% Confidence Interval Two-Lane Outcomes

3.1.3.2 Four-Lane Forecasts

This section presents 30 year risk analysis forecasts of peak season AADT along the MT 16 and US 2 sections of the study area corridor assuming that the sections are expanded to four-lane capacities.

Figure 15 below depicts the peak season AADT forecasts for the MT 16 section of the study area corridor assuming a four-lane capacity. As can be seen, there is a 50% chance that AADT will reach about 5,800 vehicles in the next 30 years, while there is a 10% chance that the AADT could be as high as 8,700 within the same time frame. A 10% chance also exists for peak season AADT to only grow to about 4,500 vehicles by 2036.

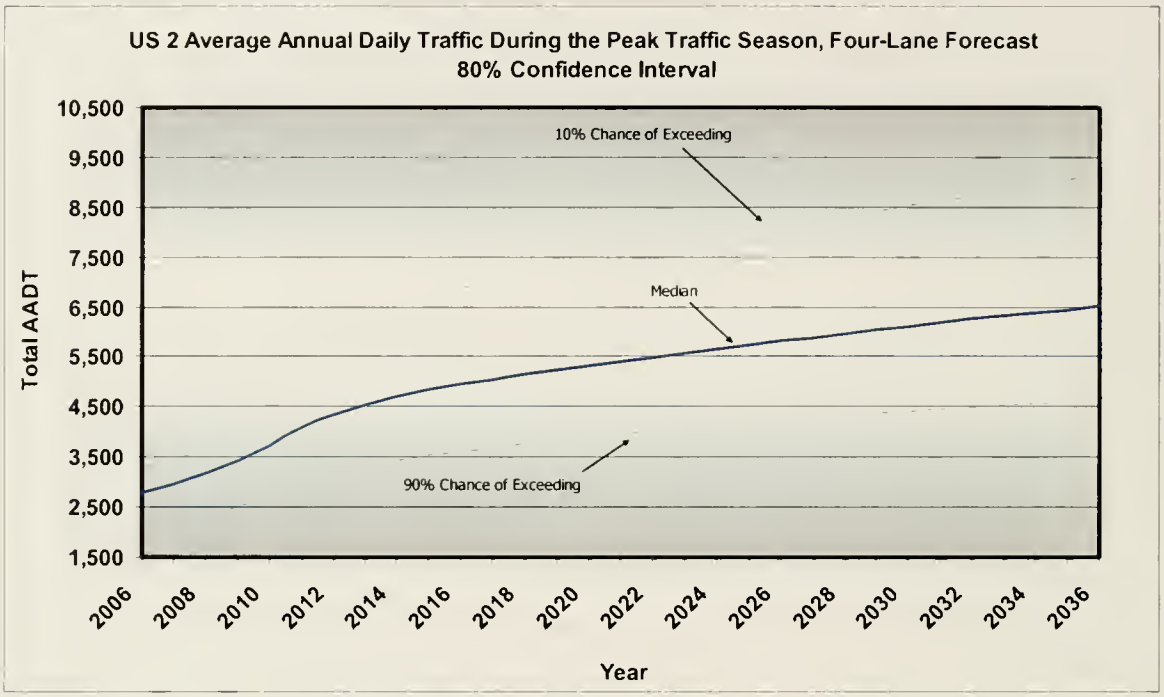
Figure 15



MT 16 30-Year Peak Season AADT Forecasts, 80% Confidence Interval Four-Lane Outcomes

In Figure 16 the peak season AADT forecasts for the US 2 section of the study area corridor are pictured. The median level of AADT during the peak season is expected to be about 6,500 by 2036. Meanwhile, there is a 10% chance that the AADT could be as high as 9,000 in the same year; but, there is also a 10% chance that the AADT might only grow to approximately 4,600 within the next 30 years.

Figure 16



US 230-Year Peak Season AADT Forecasts, 80% Confidence Interval Four-Lane Outcomes

3.2 Risk Analysis of Vehicle Distribution

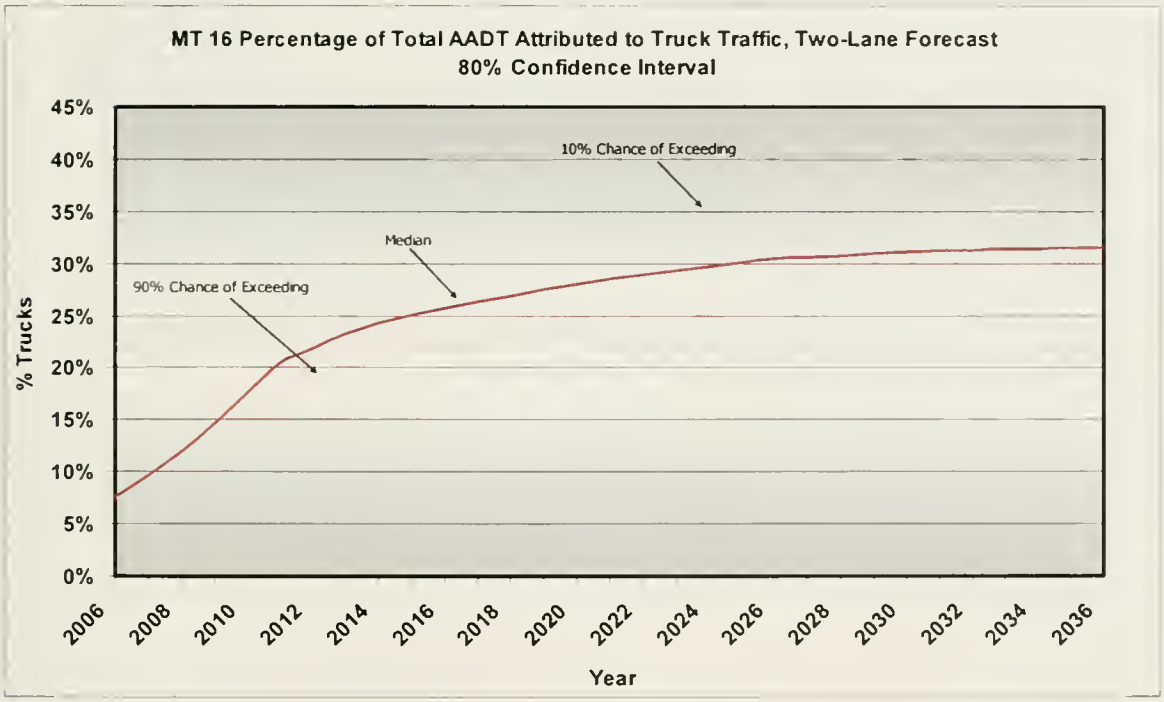
In this section risk analysis results for the forecasts of the percentage of overall AADT that is attributable to truck traffic are presented. These forecasts are for both the MT 16 and US 2 study area corridor sections under both two-lane and four-lane scenarios over the next 30 years. These forecasts, like the previous section's risk analysis forecasts, are presented in the form of 80% confidence intervals.

3.2.1 Two-Lane Forecasts

Figures 17 and 18 that follow represent 80% confidence interval forecasts under the two-lane corridor scenario for the MT 16 and US 2 sections of the study area corridor.

In Figure 17 it can be seen that the median percent trucks level for the MT 16 section of the corridor is projected to be about 32% in 2036, while there is a 10% chance this level could reach about 38% by the same year. There is also a 10% chance that the percent of trucks in the traffic stream only reaches 25% within the next 30 years.

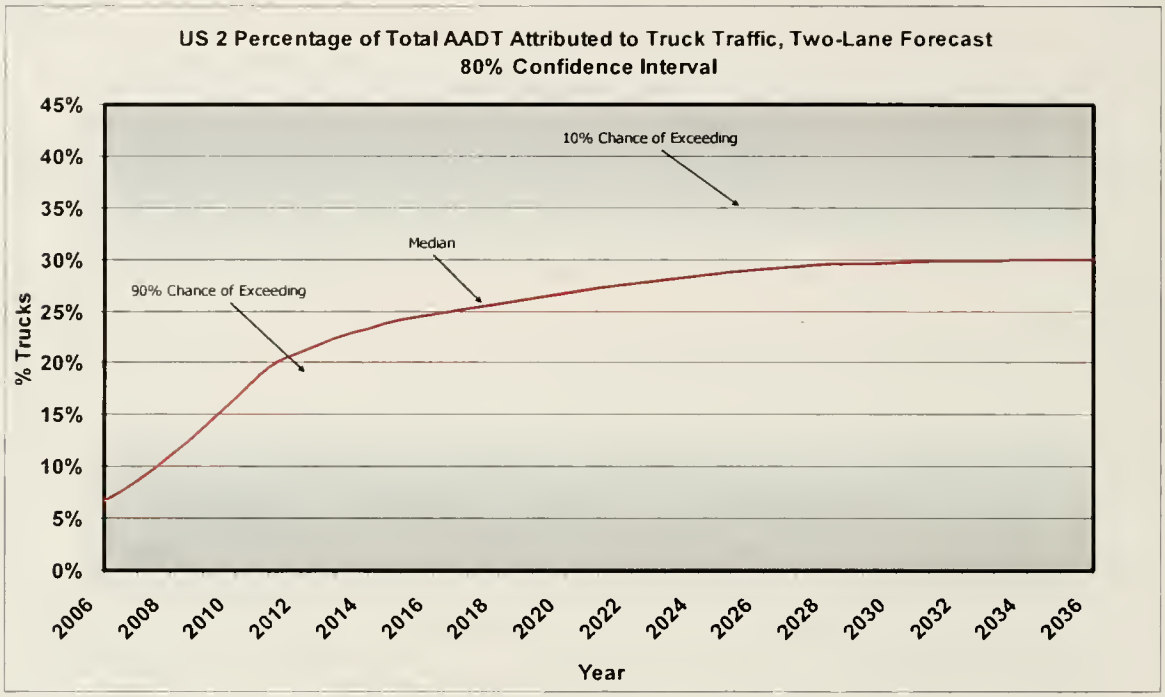
Figure 17



MT 16 30-Year Forecasts, Percentage of AADT, Truck; 80% Confidence Interval Two-Lane Outcomes

Figure 18 shows the risk analysis forecast for the percent trucks along the US 2 section of the study area corridor. In 2036 it is projected that the median level of truck traffic share will be 30%, while there is a 10% chance this share could be 37% by the same year. A 10% chance also exists that the share of truck traffic will only reach 24% within the next 30 years.

Figure 18



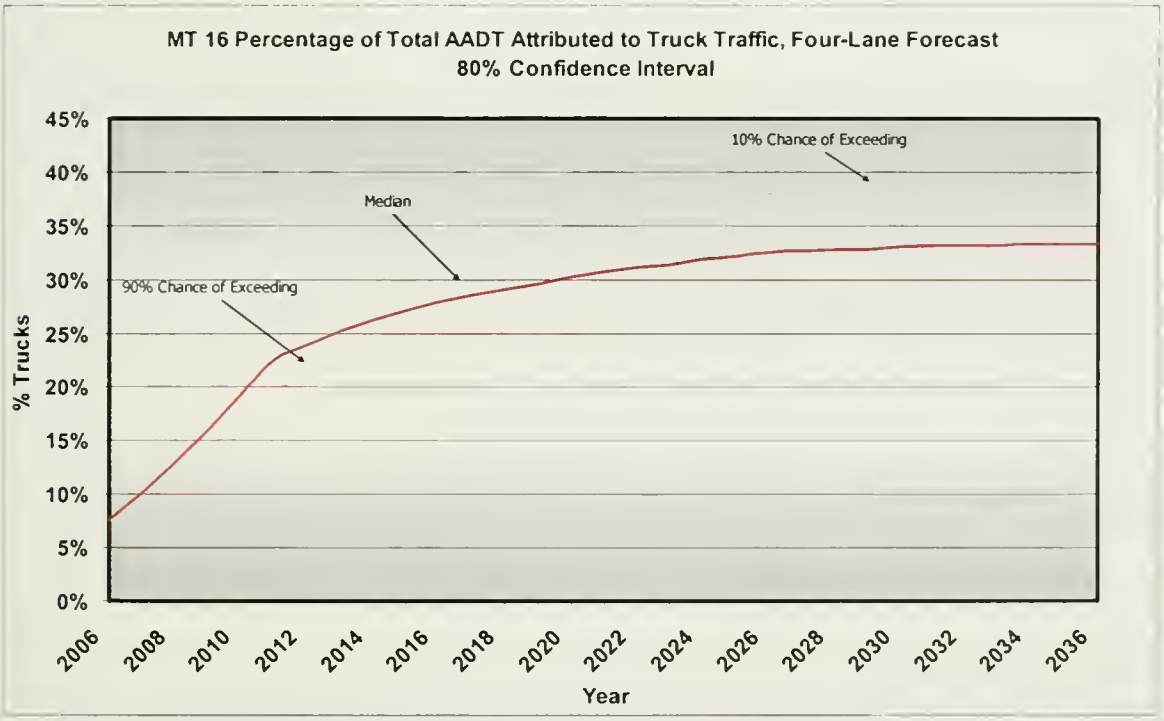
US 2 30-Year Forecasts, Percentage of AADT, Truck: 80% Confidence Interval Two-Lane Outcomes

3.2.2 Four-Lane Forecasts

The risk analysis forecasts of the percent trucks in the traffic stream for the study area corridor sections, assuming that they are expanded to four-lane capacities, are presented in the following figures.

Figure 19 illustrates the four-lane forecasts for the MT 16 section of the study area corridor with regards to the percentage of overall traffic attributable to truck traffic. By 2036, it is projected that the median level of trucks in the overall traffic volume will be about 33%, while by the same year there is a 10% chance that the share of trucks amongst overall traffic could be as high as 40%. There is also a 10% chance that truck traffic would only be as high as about 27% of the overall traffic.

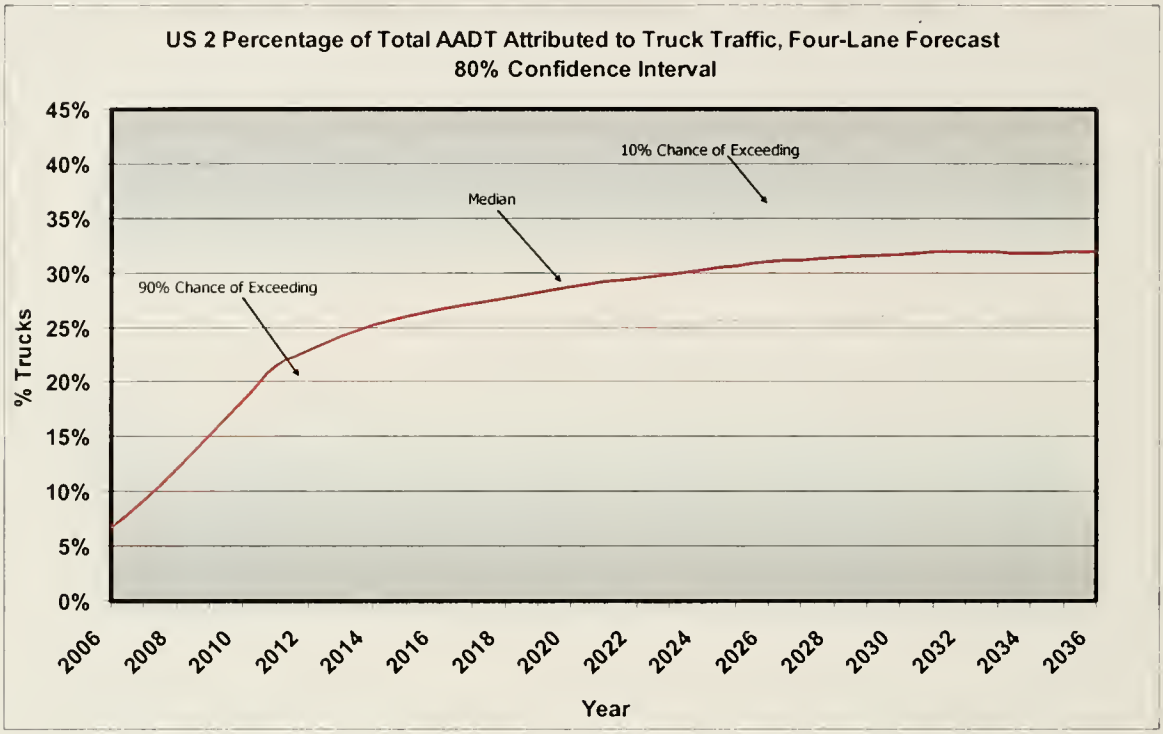
Figure 19



MT 16 30-Year Forecasts, Percentage of AADT, Truck; 80% Confidence Interval Four-Lane Outcomes

Figure 20 shows the truck traffic percentage forecasts for the US 2 section of the study area corridor. Within the next 30 years, the median level of truck traffic is projected to be about 32% of the overall traffic stream. There is also a 10% chance that the truck distribution could be about 38% and also a 10% chance that this distribution might only be about 26% within the next 30 years.

Figure 20



US 2 30-Year Forecasts, Percentage of AADT, Truck; 80% Confidence Interval Four-Lane Outcomes

3.2.3 Peak Season Forecasts

To account for the peak season increases in traffic volumes a general factor was used to increase overall traffic to peak season levels. Because this factor affects all traffic, both auto and truck, there is no change in the relative distribution of truck traffic to the overall traffic volume. Thus the peak season forecasts for the percentage of overall traffic attributable to truck traffic remain at the same levels as those presented in the previous section.

3.3 Tabular Results

Numerical risk analysis results in tabular format for the MT 16 and US 2 sections of the study area corridor is presented within this section. Results are presented for overall AADT and the percentage of traffic attributable to truck traffic by selected years and also for both the two-lane and four-lane scenarios.

3.3.1 Two-Lane Forecasts

Table 1, which follows, summarizes the risk analysis forecasts of AADT and percentage of traffic attributable to trucks for both the MT 16 and US 2 corridor sections for the two-lane scenario.

Table 1

Two-Lane Corridor, Forecasts

Year	Highway Segment	Median	90% Chance of Exceeding	10% Chance of Exceeding
2006	MT 16, AADT	1,838	-	-
	MT 16, % Trucks	7.6%	-	-
	US 2, AADT	1,897	-	-
	US 2, % Trucks	6.7%	-	-
2011	MT 16, AADT	2,407	2,148	2,670
	MT 16, % Trucks	20.4%	17.6%	23.3%
	US 2, AADT	2,501	2,231	2,779
	US 2, % Trucks	19.6%	16.9%	22.3%
2016	MT 16, AADT	2,795	2,478	3,108
	MT 16, % Trucks	25.7%	22.1%	29.7%
	US 2, AADT	2,902	2,577	3,244
	US 2, % Trucks	24.7%	21.0%	28.6%
2026	MT 16, AADT	3,255	2,833	3,739
	MT 16, % Trucks	30.4%	25.2%	36.1%
	US 2, AADT	3,378	2,943	3,903
	US 2, % Trucks	29.1%	23.8%	34.6%
2036	MT 16, AADT	3,597	3,047	4,266
	MT 16, % Trucks	31.4%	24.9%	37.9%
	US 2, AADT	3,739	3,169	4,472
	US 2, % Trucks	29.9%	23.6%	36.5%

3.3.2 Four-Lane Forecasts

In Table 2, the risk analysis forecasts are presented for the study area corridor, assuming that the corridor sections were expanded to four-lane capacity.

Table 2

Four-Lane Corridor, Forecasts

Year	Highway Segment	Median	90% Chance of Exceeding	10% Chance of Exceeding
2006	MT 16, AADT	1,838	-	-
	MT 16, % Trucks	7.6%	-	-
	US 2, AADT	1,897	-	-
	US 2, % Trucks	6.6%	-	-
2011	MT 16, AADT	2,668	2,381	2,966
	MT 16, % Trucks	22.4%	19.5%	25.4%
	US 2, AADT	2,784	2,476	3,098
	US 2, % Trucks	21.4%	18.7%	24.3%
2016	MT 16, AADT	3,246	2,885	3,603
	MT 16, % Trucks	27.9%	24.1%	31.7%
	US 2, AADT	3,381	2,978	3,759
	US 2, % Trucks	26.6%	22.9%	30.5%
2026	MT 16, AADT	3,813	3,312	4,354
	MT 16, % Trucks	32.5%	27.2%	37.9%
	US 2, AADT	3,967	3,418	4,539
	US 2, % Trucks	31.0%	25.8%	36.3%
2036	MT 16, AADT	4,226	3,582	4,957
	MT 16, % Trucks	33.3%	27.0%	39.9%
	US 2, AADT	4,380	3,699	5,203
	US 2, % Trucks	31.8%	25.7%	38.3%

3.3.3 Peak Season Tabular Forecasts

Tables 3 and 4 present numerical tabular results for peak season AADT and traffic distribution for selected years for the MT 16 and US 2 study area corridor sections under both the two-lane and four-lane scenarios.

Table 3

Two-Lane Corridor, Peak Season Forecasts

Year	Highway Segment	Median	90% Chance of Exceeding	10% Chance of Exceeding
2006	MT 16, AADT	2,697	-	-
	MT 16, % Trucks	7.6%	-	-
	US 2, AADT	2,784	-	-
	US 2, % Trucks	6.7%	-	-
2011	MT 16, AADT	3,524	2,580	4,833
	MT 16, % Trucks	20.4%	17.6%	23.3%
	US 2, AADT	3,660	2,676	5,040
	US 2, % Trucks	19.6%	16.9%	22.3%
2016	MT 16, AADT	4,106	2,973	5,642
	MT 16, % Trucks	25.7%	22.1%	29.7%
	US 2, AADT	4,267	3,103	5,865
	US 2, % Trucks	24.7%	21.0%	28.6%
2026	MT 16, AADT	4,828	3,445	6,630
	MT 16, % Trucks	30.4%	25.2%	36.1%
	US 2, AADT	4,999	3,578	6,919
	US 2, % Trucks	29.1%	23.8%	34.6%
2036	MT 16, AADT	5,362	3,790	7,510
	MT 16, % Trucks	31.5%	25.0%	38.0%
	US 2, AADT	5,590	3,931	7,800
	US 2, % Trucks	30.0%	23.6%	36.5%

Table 4

Four-Lane Corridor, Peak Season Forecasts

Year	Highway Segment	Median	90% Chance of Exceeding	10% Chance of Exceeding
2006	MT 16, AADT	2,697	-	-
	MT 16, % Trucks	7.6%	-	-
	US 2, AADT	2,784	-	-
	US 2, % Trucks	6.7%	-	-
2011	MT 16, AADT	3,928	2,863	5,393
	MT 16, % Trucks	22.4%	19.6%	25.5%
	US 2, AADT	4,092	2,984	5,649
	US 2, % Trucks	21.4%	18.7%	24.3%
2016	MT 16, AADT	4,768	3,472	6,577
	MT 16, % Trucks	27.9%	24.1%	31.8%
	US 2, AADT	4,946	3,603	6,866
	US 2, % Trucks	26.6%	22.9%	30.5%
2026	MT 16, AADT	5,630	4,032	7,770
	MT 16, % Trucks	32.5%	27.2%	37.9%
	US 2, AADT	5,819	4,241	8,123
	US 2, % Trucks	31.0%	25.8%	36.4%
2036	MT 16, AADT	6,272	4,424	8,785
	MT 16, % Trucks	33.4%	27.1%	40.0%
	US 2, AADT	6,507	4,643	9,155
	US 2, % Trucks	31.9%	25.7%	38.3%

4 SUMMARY OF FINDINGS AND CONCLUSIONS

4.1 Summary of Findings

Overall median daily traffic on the MT 16 and US 2 sections of the TRE are projected to double over the next 30 years.

Table 5 illustrates two-lane and four-lane forecasts for the median levels of overall traffic and the percent of that traffic attributable to trucks that is projected to occur over the next 30 years along each highway segment.

Table 5
Growth in Vehicle Traffic and Percent Trucks, Two-Lane and Four-Lane Forecasts

		Two-Lane	Four-Lane
Year	**Highway Segment**	**Median**	**Median**
2006	**MT 16, AADT**	1,838	1,838
	MT 16, % Trucks	7.6%	7.6%
	US 2, AADT	1,897	1,897
	US 2, % Trucks	6.7%	6.7%
2036	**MT 16, AADT**	3,597	4,226
	MT 16, % Trucks	31.5%	33.4%
	US 2, AADT	3,739	4,380
	US 2, % Trucks	30.0%	31.9%

The percentage of trucks in overall traffic within the study area corridor is expected to increase from under 10 percent today to over a median level of 30 percent after 2036.

4.2 Conclusions

The MT 16 and US 2 sections of the TRE corridor within Montana are projected to gradually transform into a freight corridor over the next 30 years creating significant vehicular traffic growth, especially in large trucks. The growth in freight volumes traversing the corridor is forecasted to increase steadily over the next 30 years to a point where 30% of the overall vehicle daily traffic is expected to be comprised of large trucks.

Since trucks consume more of a highway's capacity than do passenger vehicles, and various qualities of a roadway affect its potential capacity, detailed analysis is required to determine a roadway's level of service rating, beyond just utilizing traffic counts. Furthermore, the safety

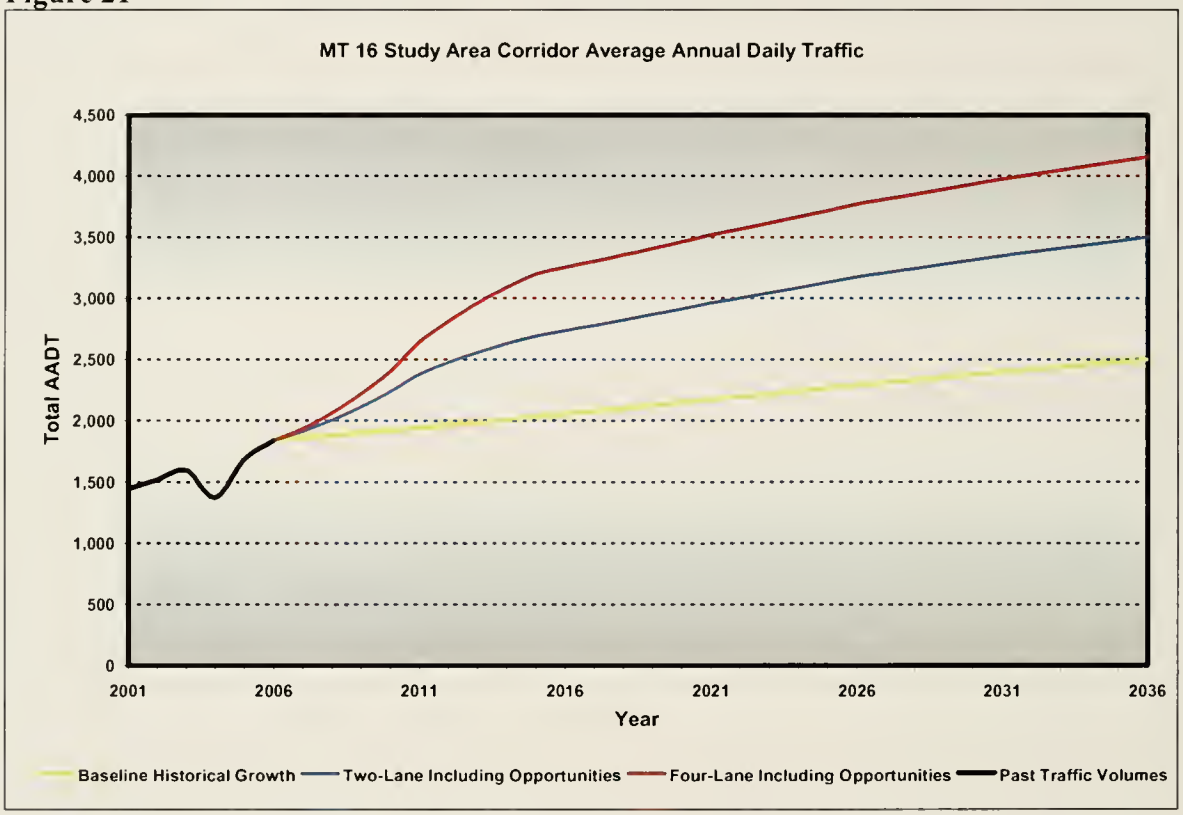
performance of rural two-lane roadways as compared to four-lane rural highways needs to be analyzed to be able to calculate the safety benefits, if any, that would arise from expansion of the study area corridor to four lane capacity.

With these concerns in mind, level of service calculations and an analysis of the safety ramifications of the study area corridor's vehicle growth will be presented, in detail, within a separate document, Working Paper #5.

5 APPENDIX A: TRAFFIC VOLUME FORECAST DECOMPOSITIONS

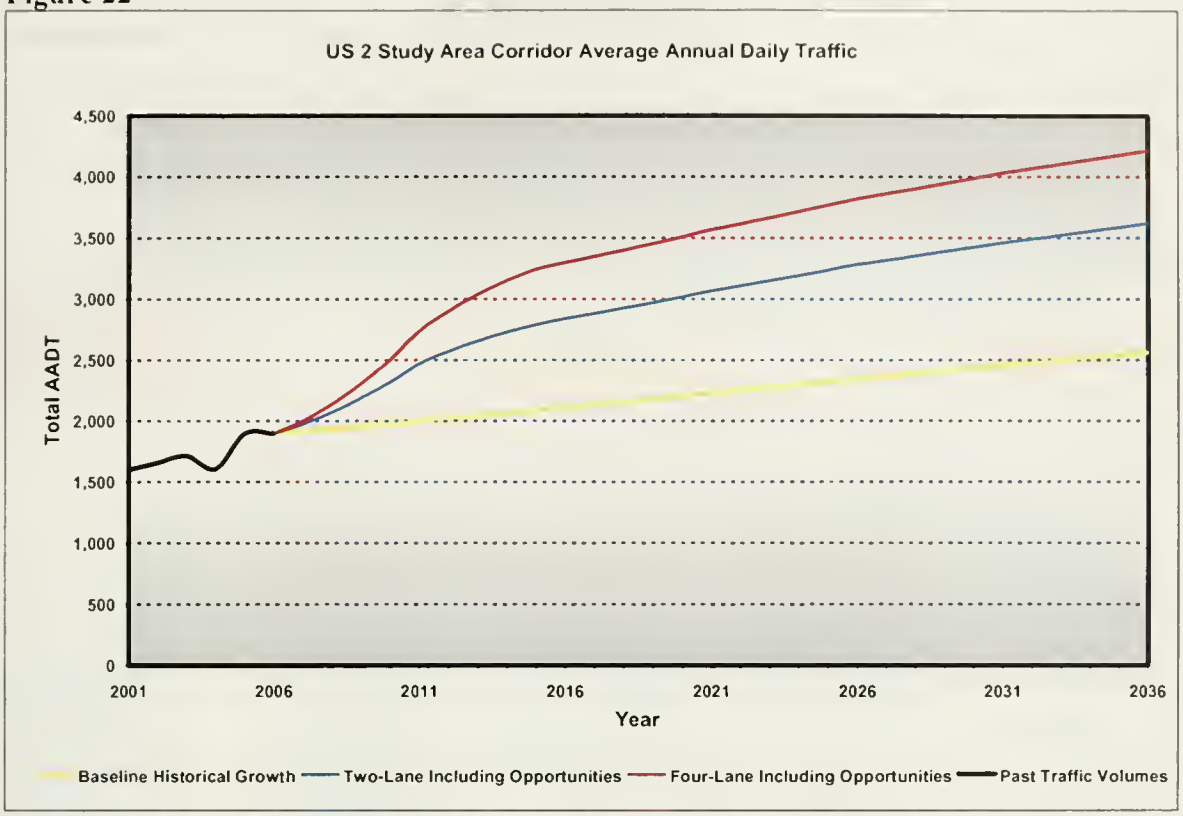
Figures 21 and 22 illustrate the baseline historical growth in traffic volume and forecasts of traffic volumes for both a two-lane and a four-lane corridor. Forecasts shown for the two-lane and four-lane corridor include the baseline historical growth plus traffic growth due to itemized opportunities and additional ADT growth due to opportunities beyond those listed in the opportunity register.

Figure 21



MT 16 AADT Forecasts, Mean Expected Outcomes

Figure 22



US 2 AADT Forecasts, Mean Expected Outcomes

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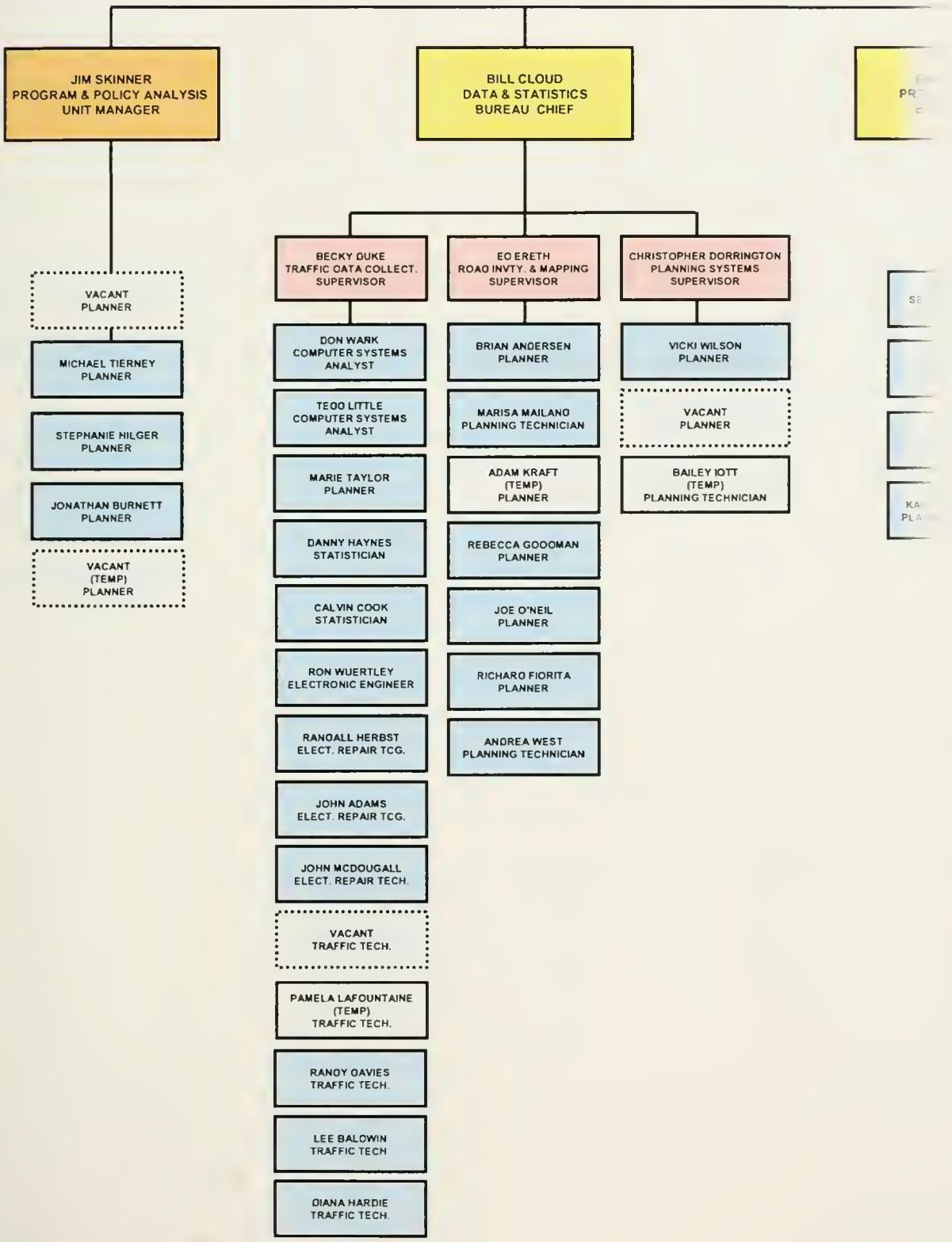

Working Paper #5:
Level of Service & Safety

Montana Department of Transportation

TRANSPORTATION REGIONAL ECONOMIC DEVELOPMENT

TRED

THEODORE ROOSEVELT EXPRESSWAY

Working Paper #5: Level of Service and Safety

Final

Prepared by:

MDT Traffic and Safety Bureau

and

HDR | HLB Decision Economics Inc.

8403 Colesville Road, Suite 910
Silver Spring, Maryland 20910
Tel: (240) 485-2600
Fax: (240) 485-2635

April 2007

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1 INTRODUCTION

Overview

Safety and Level of Service are the two key issues that transportation planners and decision-makers at federal, state, and local levels aim at addressing. While level of service rating relates the overall efficiency of the roadway in facilitating the flow of traffic, overall accident rate or fatal accident rate of the roadway represents the safety performance of the roadway.

The level of service rating of a roadway relates how well the roadway is performing its primary function, allowing motorists to travel to their destinations in a timely and efficient manner. When level of service is high, traffic flows freely and without congestion, but as the level of service declines, vehicular interactions increase and traffic speeds decline due to the addition of traffic congestion.

In rural areas, congestion is not a major factor and therefore the focus is mainly on the safety of the roadways. Safety issues in rural areas can range from geometry related-issues which affect visibility (horizontal and vertical alignment), intersections, side slope conditions, clear zones, lack of passing lanes, truck volumes and speed differential.

There are many options available to address safety issues on rural highways. Each roadway segment can be analyzed to determine the appropriate treatment to improve safety. Some of the treatments can be improving the horizontal and vertical alignment of the roadway, providing flatter side slopes, providing clear zone, providing wider shoulders, providing auxiliary turn lanes where needed, providing passing lanes where needed, and expanding a two-lane facility to a four-lane facility where justified based on capacity and/or safety.

This paper addresses the capacity and safety issues as it relates to the TRED corridor. Given the findings, stated in Working Paper #4, pertaining to the projected high percentage of truck traffic in the next twenty years. The capacity analysis used the truck percentage of thirty.

2 LEVEL OF SERVICE

This section provides an overview of level of service (LOS), TRED level of service planning goals, and the existing capacity and level of service in the study area. Traffic volumes for the TRED corridor are compared with capacities to determine the current quality of service on the highway.

2.1 Levels of Service

2.1.1 Categories

Level of service is a method of measuring the vehicle capacity in an area. When the capacity of a roadway is exceeded, this condition results in congestion and a poor level of service. Six levels of service ranging from A to F are used to define congestion and the operating conditions on roadways, with LOS A representing the best operating conditions (free-flowing traffic) and LOS F the worst operating conditions (extremely congested, stop-and-go traffic). Table 1 illustrates the level of service for a two-lane, Class I highway (primary arterials connecting major traffic generators/daily commuter routes/primary links to state or national highway networks) according to highway capacity standards.

Table 1: Level of Service Criteria for Two-Lane Highways in Class I

Level of Service (LOS)	Level of Service Definitions	Percent of Time Spent Following Other Vehicles	Average Vehicle Speed (mph)
A	Motorists can travel at their desired speed. No more than 35% of the time is spent following other vehicles.	35%	55
B	Average speed of 50–55 mph. Demand for passing is high. 50% of the time is spent following other vehicles.	35–50%	50–55
C	Average speed of 45–50 mph. Noticeable increase in following traffic with reduction in passing opportunities.	50–65%	45–50
D	Unstable traffic flow. Passing demand is high but passing opportunities approach zero. Vehicle following length of 5 to 10 vehicles and average speeds of 40–45 mph.	65–80%	40–45
E	Average speed below 40 mph. 80% of the time is spent following other vehicles. Passing is virtually impossible.	80%	40

Level of Service (LOS)	Level of Service Definitions	Percent of Time Spent Following Other Vehicles	Average Vehicle Speed (mph)
LOS F applies whenever the number of vehicles traveling on the highway exceeds the roadway capacity			
Average Vehicle Speed assumes a free-flow speed of 60 mph			
Source: Transportation Research Board 2000			

2.1.2 Planning Goals

According to Table 1 above, level of service on two-lane rural highways is defined by speed and percent of time spent following other vehicles. As traffic levels increase, particularly with the presence of trucks and heavy vehicles, the amount of time vehicles spend following other vehicles increases. Speeds begin to decline slightly, the freedom to maneuver within the traffic stream is more noticeably limited, and drivers often experience reduced physical and psychological comfort. This decrease in speed and increase in time spent following other vehicles leads to both a decreased level of service and a possible increase in accident rates as drivers seek opportunities to pass.

Consistent with the Federal Highway Administration's functional classification criteria, the TRED corridor is a rural principal arterial, which applies to the highways that typically provide high travel speeds and the longest trip movements. A highway's functional classification determines which geometric design standards are applied for that facility. MDT's Road Design Manual contains geometric design and level of service guidelines for roads, based on functional classification. As a general design consideration, designers should strive for the highest level of service that is practical and is consistent with anticipated conditions. For principal arterials in level terrain, such as the TRED corridor, MDT has set a level of service objective of "B".

2.2 Existing and Future Level of Service

For the analysis of the level of service conditions on the TRED corridor, the study area was divided into three segments: MT 16 from the Port of Raymond to Plentywood, MT 16 from Plentywood to Culbertson, and US 2 from Culbertson to the North Dakota State line.

MDT has adopted the Highway Capacity Manual (HCM) as the standard methodology for calculating level of service. The HCM presents the nationwide criteria for performing capacity analyses for highway facilities. Included in Appendix A are the LOS calculation worksheets for the TRED corridor. The existing lane configuration was used in our analysis for both the existing traffic volumes and proposed future traffic volumes in 2036. future traffic volumes used in the capacity analysis are those from Working Paper #4 that have a 10% chance of exceeding in 2036.

2.2.1 Existing Level of Service

The existing level of service analysis used traffic volume, large-truck percentage, percent of passing zones, the number of access points (driveways, roads, etc.) per mile, and lane

and shoulder width information provided by MDT in the analysis. Other factors, such as the type of terrain or the directional traffic split (the amount of vehicle traveling in each direction) were determined from local observation or by applying default values from the HCM, which is consistent with the guidance in MDT's Road Design Manual.

2.2.2 Future Level of Service

The future level of service analysis was performed using the same assumptions for the existing conditions with some modifications to account for the future peak travel period.

Table 2 illustrates the results of the analysis of existing (2006) and future (2036) level of service conditions for each segment of the TRED corridor. As shown in Table 2, the existing and future levels of service meet the guidelines of LOS "B" for this type of facility.

Table 2: TRED Corridor Current and Future Levels of Service

Segment	MDT LOS Guidelines	2006 LOS	2036 LOS[a]	Terrain
MT 16 from Port of Raymond to Plentywood	B	A	B	Level
MT 16 from Plentywood to Culbertson	B	A	B	Level
US 2 from Culbertson to the North Dakota State line	B	A	B	Level

[a] The existing highway corridor was used with no improvements.

Table 2 above provides the level of service for the TRED corridor based on existing conditions and the year 2036, assuming no capacity-related improvements to the corridor. The future capacity analyses were performed using statistical median traffic volumes, as well as volumes for the 10-percent and 90-percent confidence intervals. As shown in Table 2, with the future traffic volumes for the 10-percent confidence interval (worst case scenario), the TRED corridor will operate at an acceptable LOS "B" in 2036 with no capacity related improvements. As shown in the LOS worksheets in the appendix, the LOS is at the upper end of the "B" range and close to the "C" range.

3 SAFETY ANALYSIS

With over 42,000 fatalities occurring annually on America's highways, improving highway safety performance is central component of the Federal Highway Administration's mission, accordingly, FHWA's website states, "Safety on our highways is FHWA's top priority." Highway safety is also listed as one of the three Federal Highway Administration's "Vital Few Priorities," comprising safety, congestion mitigation, and environmental stewardship and streamlining. Consequently, it is clear that FHWA considers safety improvements to be of critical importance when determining the validity of highway improvement projects.

Likewise the Montana Department of Transportation takes into account the safety benefits of transportation projects it considers undertaking. The importance of improving the safety of Montana's roadways is apparent as safety is framed as one of the key elements of MDT's mission statement.

> "MDT's mission is to serve the public by providing a transportation system and services that emphasize quality, safety, cost effectiveness, economic vitality and sensitivity to the environment."

As government institutions charged with serving the public, increasing the safety performance of roadways is one of the primary methods that transportation agencies can use to increase the public welfare. It is because of this fact, that opportunities to improve the safety of the nation's roadways are a key consideration in transportation planning decisions.

The commitment to improving highway safety by both FHWA and MDT is evident by the central placement of safety within their mission statements. The importance of that commitment is clear; increasing the safety performance of roadways affects the public directly by reducing injuries, property damage, and fatalities. This reality is the motivation for this chapter's analysis.

3.1 Existing Research

An extensive search for the safety benefits of a 4-lane roadway compared to a 2-lane roadway was completed. However, no comparable routes to the TRED corridor were found. Therefore, conclusion from the studies in other corridors can not be used to draw conclusions in the TRED corridor.

3.2 Speed Limit Differential

The MT 16 and US 2 sections of the TRED corridor within the state of Montana are governed by dual speed limits; one limit for large trucks, and a 10 mph higher limit for passenger vehicles.

Because of this disparity in speed limits, it was hypothesized that an inherent unsafe driving environment existed. A 2003 study and a 2006 follow-up both by Garber et al. examined states with dual speed limits and ones without to determine if the dual speed limit states showed increased crash rates. The studies looked at six states, three of which maintained a uniform speed limit during the 1990's, Arizona, Missouri, and North Carolina. Two of the states examined changed to a dual speed limit during this time period, Idaho and Arkansas. And one state changed from a differential speed limit to a uniform speed limit, Virginia. The authors conducted statistical tests across road segments within each state to determine if there were any statistically significant increases in the crash rates across the groups of states. They found no consistent link to increased crash rates within the states that had dual speed limits.

These studies, however, only considered multi-lane interstate sections, focusing on the expected safety hazard where slower moving trucks are traveling in the right lane and faster moving cars are passing the larger trucks while traveling in the left lane of the four-lane highway. Because of this fact, the results may not reflect the true safety ramifications along two-lane rural roadways, such as those comprising the study area corridor.

3.3 Montana Crash Data

Montana crash data for the MT 16 and US 2 sections of the TRED study area corridor and other comparable rural two-lane roadways is provided in Table 3. The sections of roadways outside the study area corridor were selected because they exhibit similar traffic volumes and have similar fractions of overall traffic composed of large trucks. Crash rates and severity rates for overall traffic and for large trucks are shown in Table 3.

Table 3: Crash and Severity Rates for Various Rural Two-Lane and Four-Lane Montana Roadways 2001-2005 (Per Million VMT)

Roadway Segment	Milepost Start	Milepost End	Description	Segment AADT	Percent Trucks	Overall Crash Rate	Truck Crash Rate	Overall Severity Rate
N-1 (US 2)	**645**	**667**	**Culbertson to North Dakota Border**	**1186**	**10.7%**	**1.40**	**0.78**	**3.44**
N-34 (MT 16)	**0**	**15.4**	**Saskatchewan Border to Plentywood**	**731**	**12.7%**	**0.15**	**0.39**	**0.60**
N-22 (MT 16)	**42.3**	**88.5**	**Plentywood to Culbertson**	**1028**	**14.4%**	**0.63**	**0.88**	**1.63**
N-1 (US 2)	383.7	428.5	US-2 Havre to Fort Belknap	2727	8.7%	1.27	1.13	2.54
N-62 (MT 16)	0	36.6	Culbertson to Sidney	1142	12.1%	0.91	1.00	1.56
N-53 (MT 3)	3.5	46.7	Billings to Lavina	2181	13.0%	0.69	0.76	1.42
N-14(MT 3)	99	146	Harlowton to Lavina	1554	19.1%	0.95	0.55	1.86
N-8 (US 12) 4-lane	32.5	40.5	Helena to bottom of MacDonald Pass	3944	9.0%	2.07	0.93	2.75
N-14 (MT 3)4-lane w/ TWLTL	87.3	90.4	Great Falls to Jct. S227/S228	6202	9.4%	1.34	0.90	3.77

Segments that comprise the Montana portion of the TRED corridor are highlighted in bold

The crash and severity rates listed in the above table can be compared to the statewide averages for rural principal arterials on the National Highway System (NHS). The statewide average for the crash rate is 1.24 and for severity the rate is 2.88. As can be shown in the table above the only segment that is over the statewide average crash rate and severity rate is the segment of US 2 between Culbertson and the North Dakota Border.

The crashes were analyzed in more detail on the segments within the TRED corridor and the results are as follows:

	Single Vehicle	Multiple Vehicle Turning Related	Multiple Vehicle Passing Related	Involves Trucks
US 2 Culbertson to North Dakota Border	86.6%	9.0%	1.5%	6%
MT 16 Saskatchewan Border to Plentywood	100%			33%
MT 16 Plentywood to Culbertson	83.6%	3.6%	1.8%	18%

3.4 Projected Safety Conditions

The projected safety conditions were analyzed extensively in the US-2, Havre to Fort Belknap EIS for different lane configurations. The lane configurations analyzed were the No build, Improved 2-lane, Improved 2-lane with passing lanes, 4-lane undivided, and 4-lane divided. The US-2, Havre to Fort Belknap is a similar corridor to the TRED corridor as was shown in Table 3. The crash rate used in the EIS was for the years 1997 through 2001. The decrease in the crash rate with the above lane configurations are as follows:

	Crash Rate	Change From Existing Condition	Incremental Change
No build	1.51	0	0
Improved 2-lane	1.36	0.15	0.15
Improved 2-lane with passing lanes	1.26	0.25	0.10
4-lane undivided	1.22	0.29	0.04
4-lane divided	1.13	0.38	0.09

As can be shown above, the projected safety benefits for a 4-lane undivided facility is marginal over an improved 2-lane with passing lanes.

4 CONCLUSION

Concluding Remarks

- An improved 2-lane would provide the necessary capacity for this corridor to function adequately.
- With 30% trucks and the associated speed differential, a four-lane facility will help with the passing conflicts throughout the entire segment.
- US 2 from Culbertson to the North Dakota state line has an average crash rate and severity rate exceeding statewide averages.
- As the corridor approaches the design year traffic volumes, the corridor will be approaching LOS "C" conditions.
- With increasing traffic volumes, passing conflicts will increase.
- All options (Improved 2-lane, Improved 2-lane with passing lanes, 4-lane undivided, and a 4-lane divided) will reduce the crash rate, however, the incremental benefits of a 4-lane undivided improvement over an improved 2-lane with passing lanes are minimal.

5 APPENDIX: LEVEL OF SERVICE CALCULATIONS

HCS2000: Two-Lane Highways Release 4.1c

Phone: Fax:
E-Mail:

Two-Way Two-Lane Highway Segment Analysis

Analyst	Danielle Bolan
Agency/Co.	MDT
Date Performed	10/14/2006
Analysis Time Period	
Highway	US 2
From/To	Culbertson to ND State Line
Jurisdiction	MDT
Analysis Year	2006
Description TRED Corridor	

Input Data

Highway class Class 1					
Shoulder width	2.5	ft	Peak-hour factor, PHF	0.88	
Lane width	12.0	ft	% Trucks and buses	7	%
Segment length	22.5	mi	% Recreational vehicles	4	%
Terrain type	Level		% No-passing zones	31	%
Grade: Length		mi	Access points/mi	5	/mi
Up/down		%			

Two-way hourly volume, V 190 veh/h
Directional split 60 / 40 %

Average Travel Speed

Grade adjustment factor, fG	1.00	
PCE for trucks, ET	1.7	
PCE for RVs, ER	1.0	
Heavy-vehicle adjustment factor,	0.953	
Two-way flow rate,(note-1) vp	226	pc/h
Highest directional split proportion (note-2)	136	pc/h
Free-Flow Speed from Field Measurement:		
Field measured speed, SFM	-	mi/h
Observed volume, Vf	-	veh/h
Estimated Free-Flow Speed:		
Base free-flow speed, BFFS	62.0	mi/h
Adj. for lane and shoulder width, fLS	2.6	mi/h
Adj. for access points, fA	1.2*	mi/h
Free-flow speed, FFS	58.2	mi/h
Adjustment for no-passing zones, fnp	1.2	mi/h
Average travel speed, ATS	55.2	mi/h

Percent Time-Spent-Following

Grade adjustment factor, fG	1.00	
PCE for trucks, ET	1.1	
PCE for RVs, ER	1.0	
Heavy-vehicle adjustment factor, fHV	0.993	
Two-way flow rate,(note-1) vp	217	pc/h
Highest directional split proportion (note-2)	130	
Base percent time-spent-following, BPTSF	17.4	%
Adj.for directional distribution and no-passing zones, fd/np	11.8	
Percent time-spent-following, PTSF	29.2	%

Level of Service and Other Performance Measures

Level of service, LOS	A	
Volume to capacity ratio, v/c	0.07	
Peak 15-min vehicle-miles of travel, VMT15	1214	veh-mi
Peak-hour vehicle-miles of travel, VMT60	4275	veh-mi
Peak 15-min total travel time, TT15	22.0	veh-h

Notes:
1. If vp >= 3200 pc/h, terminate analysis-the LOS is F.
2. If highest directional split vp >= 1700 pc/h, terminate analysis-the LOS is F.

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Phone: Fax:
E-Mail:

Two-Way Two-Lane Highway Segment Analysis

Analyst Danielle Bolan

Agency/Co.	MDT
Date Performed	10/14/2006
Analysis Time Period	design hour
Highway	US 2
From/To	Culbertson to ND State Line
Jurisdiction	MDT
Analysis Year	2036 - 90% Confidence
Description	TRED Corridor

Input Data

Highway class	Class 1				
Shoulder width	2.5	ft	Peak-hour factor, PHF	0.88	
Lane width	12.0	ft	% Trucks and buses	30	%
Segment length	22.5	mi	% Recreational vehicles	4	%
Terrain type	Level		% No-passing zones	31	%
Grade: Length		mi	Access points/mi	5	/mi
Up/down		%			

Two-way hourly volume, V 317 veh/h
Directional split 60 / 40 %

Average Travel Speed

Grade adjustment factor, fG	1.00	
PCE for trucks, ET	1.7	
PCE for RVs, ER	1.0	
Heavy-vehicle adjustment factor,	0.826	
Two-way flow rate,(note-1) vp	436	pc/h
Highest directional split proportion (note-2)	262	pc/h
Free-Flow Speed from Field Measurement:		
Field measured speed, SFM	-	mi/h
Observed volume, Vf	-	veh/h
Estimated Free-Flow Speed:		
Base free-flow speed, BFFS	62.0	mi/h
Adj. for lane and shoulder width, fLS	2.6	mi/h
Adj. for access points, fA	1.2*	mi/h
Free-flow speed, FFS	58.2	mi/h
Adjustment for no-passing zones, fnp	2.2	mi/h
Average travel speed, ATS	52.6	mi/h

Percent Time-Spent-Following

Grade adjustment factor, fG	1.00	
PCE for trucks, ET	1.1	
PCE for RVs, ER	1.0	
Heavy-vehicle adjustment factor, fHV	0.971	
Two-way flow rate,(note-1) vp	371	pc/h
Highest directional split proportion (note-2)	223	
Base percent time-spent-following, BPTSF	27.8	%
Adj.for directional distribution and no-passing zones, fd/np	11.8	
Percent time-spent-following, PTSF	39.6	%

Level of Service and Other Performance Measures

Level of service, LOS	B	
Volume to capacity ratio, v/c	0.14	
Peak 15-min vehicle-miles of travel, VMT15	2026	veh-mi
Peak-hour vehicle-miles of travel, VMT60	7133	veh-mi
Peak 15-min total travel time, TT15	38.5	veh-h

Notes:
1. If vp >= 3200 pc/h, terminate analysis-the LOS is F.
2. If highest directional split vp >= 1700 pc/h, terminate analysis-the LOS is F.

HCS2000: Two-Lane Highways Release 4.1c

Phone: Fax:
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Two-Way Two-Lane Highway Segment Analysis

Analyst	Danielle Bolan
Agency/Co.	MDT
Date Performed	10/14/2006
Analysis Time Period	design hour
Highway	US 2
From/To	Culbertson to ND State Line
Jurisdiction	MDT
Analysis Year	2036 - Median
Description	TRED Corridor

Input Data

Highway class	Class 1				
Shoulder width	2.5	ft	Peak-hour factor, PHF	0.88	
Lane width	12.0	ft	% Trucks and buses	30	%
Segment length	22.5	mi	% Recreational vehicles	4	%
Terrain type	Level		% No-passing zones	31	%
Grade: Length		mi	Access points/mi	5	/mi
Up/down		%			

Two-way hourly volume, V 374 veh/h
Directional split 60 / 40 %

Average Travel Speed

Grade adjustment factor, fG	1.00	
PCE for trucks, ET	1.7	
PCE for RVs, ER	1.0	
Heavy-vehicle adjustment factor,	0.826	
Two-way flow rate,(note-1) vp	514	pc/h
Highest directional split proportion (note-2)	308	pc/h
Free-Flow Speed from Field Measurement:		
Field measured speed, SFM	-	mi/h
Observed volume, Vf	-	veh/h
Estimated Free-Flow Speed:		
Base free-flow speed, BFFS	62.0	mi/h
Adj. for lane and shoulder width, fLS	2.6	mi/h
Adj. for access points, fA	1.2*	mi/h
Free-flow speed, FFS	58.2	mi/h
Adjustment for no-passing zones, fnp	2.1	mi/h
Average travel speed, ATS	52.1	mi/h

Percent Time-Spent-Following

Grade adjustment factor, fG	1.00	
PCE for trucks, ET	1.1	
PCE for RVs, ER	1.0	
Heavy-vehicle adjustment factor, fHV	0.971	
Two-way flow rate,(note-1) vp	438	pc/h
Highest directional split proportion (note-2)	263	
Base percent time-spent-following, BPTSF	32.0	%
Adj.for directional distribution and no-passing zones, fd/np	14.1	
Percent time-spent-following, PTSF	46.0	%

Level of Service and Other Performance Measures

Level of service, LOS	B	
Volume to capacity ratio, v/c	0.16	
Peak 15-min vehicle-miles of travel, VMT15	2391	veh-mi
Peak-hour vehicle-miles of travel, VMT60	8415	veh-mi
Peak 15-min total travel time, TT15	45.9	veh-h

Notes:
1. If vp >= 3200 pc/h, terminate analysis-the LOS is F.
2. If highest directional split vp >= 1700 pc/h, terminate analysis-the LOS is F.

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Two-Way Two-Lane Highway Segment Analysis

Analyst	Danielle Bolan
Agency/Co.	MDT
Date Performed	10/14/2006
Analysis Time Period	design hour
Highway	US 2
From/To	Culbertson to ND State Line
Jurisdiction	MDT
Analysis Year	2036 - 10% Confidence
Description	TRED Corridor

Input Data

Highway class	Class 1				
Shoulder width	2.5	ft	Peak-hour factor, PHF	0.88	
Lane width	12.0	ft	% Trucks and buses	30	%
Segment length	22.5	mi	% Recreational vehicles	4	%
Terrain type	Level		% No-passing zones	31	%
Grade: Length		mi	Access points/mi	5	/mi

```
        Up/down              %

Two-way hourly volume, V    427     veh/h
Directional split       60  /   40  %

___________________________Average Travel Speed_____________________________

Grade adjustment factor, fG                    1.00
PCE for trucks, ET                             1.7
PCE for RVs, ER                                1.0
Heavy-vehicle adjustment factor,               0.826
Two-way flow rate,(note-1) vp                  587     pc/h
Highest directional split proportion (note-2)  352     pc/h

Free-Flow Speed from Field Measurement:
Field measured speed, SFM                       -      mi/h
Observed volume, Vf                             -      veh/h
Estimated Free-Flow Speed:
Base free-flow speed, BFFS                     62.0    mi/h
Adj. for lane and shoulder width, fLS          2.6     mi/h
Adj. for access points, fA                     1.2*    mi/h

Free-flow speed, FFS                           58.2    mi/h

Adjustment for no-passing zones, fnp           2.1     mi/h
Average travel speed, ATS                      51.6    mi/h

__________________________Percent Time-Spent-Following_____________________

Grade adjustment factor, fG                                    1.00
PCE for trucks, ET                                             1.1
PCE for RVs, ER                                                1.0
Heavy-vehicle adjustment factor, fHV                           0.971
Two-way flow rate,(note-1) vp                                  500     pc/h
Highest directional split proportion (note-2)                  300
Base percent time-spent-following, BPTSF                       35.6    %
Adj.for directional distribution and no-passing zones, fd/np 13.9
Percent time-spent-following, PTSF                             49.4    %

_________________Level of Service and Other Performance Measures___________

Level of service, LOS                                          B
Volume to capacity ratio, v/c                                  0.18
Peak 15-min vehicle-miles of travel, VMT15                     2729    veh-mi
Peak-hour vehicle-miles of travel, VMT60                       9608    veh-mi
Peak 15-min total travel time, TT15                            52.9    veh-h

Notes:
1. If vp >= 3200 pc/h, terminate analysis-the LOS is F.
2. If highest directional split vp >= 1700 pc/h, terminate
   analysis-the LOS is F.
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E-Mail:

___________________Two-Way Two-Lane Highway Segment Analysis_______________

Analyst                  Danielle Bolan
Agency/Co.               MDT
Date Performed           10/14/2006
Analysis Time Period
Highway                  MT 16
From/To                  Culbertson to Raymond
Jurisdiction             MDT
Analysis Year            2006
Description  TRED Corridor

_____________________________________Input Data_____________________________

Highway class  Class 1
Shoulder width        3.1     ft     Peak-hour factor, PHF       0.88
Lane width            12.0    ft     % Trucks and buses          8       %
Segment length        62.4    mi     % Recreational vehicles     4       %
Terrain type          Level          % No-passing zones          32      %
Grade:  Length                mi     Access points/mi            3       /mi
        Up/down               %

Two-way hourly volume, V    184     veh/h
Directional split       60  /   40  %

___________________________Average Travel Speed_____________________________

Grade adjustment factor, fG                    1.00
```

PCE for trucks, ET	1.7	
PCE for RVs, ER	1.0	
Heavy-vehicle adjustment factor,	0.947	
Two-way flow rate,(note-1) vp	221	pc/h
Highest directional split proportion (note-2)	133	pc/h

Free-Flow Speed from Field Measurement:

Field measured speed, SFM	-	mi/h
Observed volume, Vf	-	veh/h
Estimated Free-Flow Speed:		
Base free-flow speed, BFFS	62.0	mi/h
Adj. for lane and shoulder width, fLS	2.6	mi/h
Adj. for access points, fA	1.2*	mi/h
Free-flow speed, FFS	58.2	mi/h
Adjustment for no-passing zones, fnp	1.2	mi/h
Average travel speed, ATS	55.3	mi/h

Percent Time-Spent-Following

Grade adjustment factor, fG	1.00	
PCE for trucks, ET	1.1	
PCE for RVs, ER	1.0	
Heavy-vehicle adjustment factor, fHV	0.992	
Two-way flow rate,(note-1) vp	211	pc/h
Highest directional split proportion (note-2)	127	
Base percent time-spent-following, BPTSF	16.9	%
Adj.for directional distribution and no-passing zones, fd/np	11.8	
Percent time-spent-following, PTSF	28.7	%

Level of Service and Other Performance Measures

Level of service, LOS	A	
Volume to capacity ratio, v/c	0.07	
Peak 15-min vehicle-miles of travel, VMT15	3262	veh-mi
Peak-hour vehicle-miles of travel, VMT60	11482	veh-mi
Peak 15-min total travel time, TT15	59.0	veh-h

Notes:
1. If vp >= 3200 pc/h, terminate analysis-the LOS is F.
2. If highest directional split vp >= 1700 pc/h, terminate analysis-the LOS is F.

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Two-Way Two-Lane Highway Segment Analysis

Analyst	Danielle Bolan
Agency/Co.	MDT
Date Performed	10/14/2006
Analysis Time Period	design hour
Highway	MT 16
From/To	Culbertson to Raymond
Jurisdiction	MDT
Analysis Year	2036 - 90% Confidence
Description TRED Corridor	

Input Data

Highway class Class 1					
Shoulder width	3.1	ft	Peak-hour factor, PHF	0.88	
Lane width	12.0	ft	% Trucks and buses		%
Segment length	62.4	mi	% Recreational vehicles	4	%
Terrain type	Level		% No-passing zones	32	%
Grade: Length		mi	Access points/mi	3	/mi
Up/down		%			

Two-way hourly volume, V	305	veh/h		
Directional split	60 / 40	%		

Average Travel Speed

Grade adjustment factor, fG	1.00	
PCE for trucks, ET	1.7	
PCE for RVs, ER	1.0	
Heavy-vehicle adjustment factor,	0.790	
Two-way flow rate,(note-1) vp	439	pc/h
Highest directional split proportion (note-2)	263	pc/h

Free-Flow Speed from Field Measurement:

Field measured speed, SFM	-	mi/h

Observed volume, Vf	-	veh/h
Estimated Free-Flow Speed:		
Base free-flow speed, BFFS	62.0	mi/h
Adj. for lane and shoulder width, fLS	2.6	mi/h
Adj. for access points, fA	1.2*	mi/h
Free-flow speed, FFS	58.2	mi/h
Adjustment for no-passing zones, fnp	2.3	mi/h
Average travel speed, ATS	52.5	mi/h

Percent Time-Spent-Following

Grade adjustment factor, fG	1.00	
PCE for trucks, ET	1.1	
PCE for RVs, ER	1.0	
Heavy-vehicle adjustment factor, fHV	0.963	
Two-way flow rate,(note-1) vp	360	pc/h
Highest directional split proportion (note-2)	216	
Base percent time-spent-following, BPTSF	27.1	%
Adj.for directional distribution and no-passing zones, fd/np	11.8	
Percent time-spent-following, PTSF	38.9	%

Level of Service and Other Performance Measures

Level of service, LOS	B	
Volume to capacity ratio, v/c	0.14	
Peak 15-min vehicle-miles of travel, VMT15	5407	veh-mi
Peak-hour vehicle-miles of travel, VMT60	19032	veh-mi
Peak 15-min total travel time, TT15	102.9	veh-h

Notes:
1. If vp >= 3200 pc/h, terminate analysis-the LOS is F.
2. If highest directional split vp >= 1700 pc/h, terminate analysis-the LOS is F.

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Two-Way Two-Lane Highway Segment Analysis

Analyst	Danielle Bolan
Agency/Co.	MDT
Date Performed	10/14/2006
Analysis Time Period	design hour
Highway	MT 16
From/To	Culbertson to Raymond
Jurisdiction	MDT
Analysis Year	2036 - Median
Description	TRED Corridor

Input Data

Highway class	Class 1				
Shoulder width	3.1	ft	Peak-hour factor, PHF	0.88	
Lane width	12.0	ft	% Trucks and buses	32	%
Segment length	62.4	mi	% Recreational vehicles	4	%
Terrain type	Level		% No-passing zones	32	%
Grade: Length		mi	Access points/mi	3	/mi
Up/down		%			

Two-way hourly volume, V	360	veh/h
Directional split	60 / 40	%

Average Travel Speed

Grade adjustment factor, fG	1.00	
PCE for trucks, ET	1.7	
PCE for RVs, ER	1.0	
Heavy-vehicle adjustment factor,	0.817	
Two-way flow rate,(note-1) vp	501	pc/h
Highest directional split proportion (note-2)	301	pc/h
Free-Flow Speed from Field Measurement:		
Field measured speed, SFM	-	mi/h
Observed volume, Vf	-	veh/h
Estimated Free-Flow Speed:		
Base free-flow speed, BFFS	62.0	mi/h
Adj. for lane and shoulder width, fLS	2.6	mi/h
Adj. for access points, fA	1.2*	mi/h
Free-flow speed, FFS	58.2	mi/h

Adjustment for no-passing zones, fnp	2.2	mi/h
Average travel speed, ATS	52.1	mi/h

Percent Time-Spent-Following

Grade adjustment factor, fG	1.00	
PCE for trucks, ET	1.1	
PCE for RVs, ER	1.0	
Heavy-vehicle adjustment factor, fHV	0.969	
Two-way flow rate,(note-1) vp	422	pc/h
Highest directional split proportion (note-2)	253	
Base percent time-spent-following, BPTSF	31.0	%
Adj.for directional distribution and no-passing zones, fd/np	14.3	
Percent time-spent-following, PTSF	45.3	%

Level of Service and Other Performance Measures

Level of service, LOS	B	
Volume to capacity ratio, v/c	0.16	
Peak 15-min vehicle-miles of travel, VMT15	6382	veh-mi
Peak-hour vehicle-miles of travel, VMT60	22464	veh-mi
Peak 15-min total travel time, TT15	122.4	veh-h

Notes:
1. If vp >= 3200 pc/h, terminate analysis-the LOS is F.
2. If highest directional split vp >= 1700 pc/h, terminate analysis-the LOS is F.

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Phone: Fax:
E-Mail:

Two-Way Two-Lane Highway Segment Analysis

Analyst	Danielle Bolan
Agency/Co.	MDT
Date Performed	10/14/2006
Analysis Time Period	design hour
Highway	MT 16
From/To	Culbertson to Raymond
Jurisdiction	MDT
Analysis Year	2036 - 10% Confidence
Description	TRED Corridor

Input Data

Highway class	Class 1				
Shoulder width	3.1	ft	Peak-hour factor, PHF	0.88	
Lane width	12.0	ft	% Trucks and buses	38	%
Segment length	62.4	mi	% Recreational vehicles	4	%
Terrain type	Level		% No-passing zones	32	%
Grade: Length		mi	Access points/mi	3	/mi
Up/down		%			

Two-way hourly volume, V	427	veh/h
Directional split	60 / 40	%

Average Travel Speed

Grade adjustment factor, fG	1.00	
PCE for trucks, ET	1.2	
PCE for RVs, ER	1.0	
Heavy-vehicle adjustment factor,	0.929	
Two-way flow rate,(note-1) vp	522	pc/h
Highest directional split proportion (note-2)	313	pc/h
Free-Flow Speed from Field Measurement:		
Field measured speed, SFM	-	mi/h
Observed volume, Vf	-	veh/h
Estimated Free-Flow Speed:		
Base free-flow speed, BFFS	62.0	mi/h
Adj. for lane and shoulder width, fLS	2.6	mi/h
Adj. for access points, fA	1.2*	mi/h
Free-flow speed, FFS	58.2	mi/h
Adjustment for no-passing zones, fnp	2.2	mi/h
Average travel speed, ATS	52.0	mi/h

Percent Time-Spent-Following

Grade adjustment factor, fG	1.00
PCE for trucks, ET	1.1
PCE for RVs, ER	1.0

Heavy-vehicle adjustment factor, fHV	0.963	
Two-way flow rate,(note-1) vp	504	pc/h
Highest directional split proportion (note-2)	302	
Base percent time-spent-following, BPTSF	35.8	%
Adj.for directional distribution and no-passing zones, fd/np	14.0	
Percent time-spent-following, PTSF	49.8	%

Level of Service and Other Performance Measures

Level of service, LOS	B	
Volume to capacity ratio, v/c	0.16	
Peak 15-min vehicle-miles of travel, VMT15	7570	veh-mi
Peak-hour vehicle-miles of travel, VMT60	26645	veh-mi
Peak 15-min total travel time, TT15	145.6	veh-h

Notes:
1. If vp >= 3200 pc/h, terminate analysis-the LOS is F.
2. If highest directional split vp >= 1700 pc/h, terminate analysis-the LOS is F.

Environmental Scan

Montana Department of Transportation

TRANSPORTATION REGIONAL ECONOMIC DEVELOPMENT

TRED

THEODORE ROOSEVELT EXPRESSWAY

Environmental Scan

Prepared by:
HDR Engineering, Inc.

412 East Parkcenter Boulevard
Suite 100
Boise, Idaho 83702
Tel: (208) 387-7000
Fax: (208) 387-7100

April 2007

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List of Acronyms

AST	Aboveground Storage Tank
BLM	Bureau of Land Management
BMA	Block Management Area
BNSF	Burlington Northern Santa Fe (Railroad)
CERCLIS	Comprehensive Environmental Response, Compensation, and Liability Index System
CESQG	Conditionally Exempt Small Quantity Generator
ESA	Endangered Species Act
FEMA	Federal Emergency Management Agency
FHWA	Federal Highway Administration
FIRM	Flood Insurance Rate Maps
GIS	Geographic Information System
LUST	Leaking Underground Storage Tank
MDEQ	Montana Department of Environmental Quality
MDT	Montana Department of Transportation
MFWP	Montana Department of Fish, Wildlife, and Parks
MP	milepost
NFIP	National Flood Insurance Program
NPL	National Priority List
NPS	National Park Service
NRC	National Response System
NRHP	National Register of Historic Places
NWI	National Wetlands Inventory
NWR	National Wildlife Refuge
RCRA	Resource Conservation and Recovery Act
RCRIS	Resource Conservation and Recovery Information System
ROW	right-of-way
TMDL	total maximum daily load
TRE	Theodore Roosevelt Expressway
TRED	Transportation Regional Economic Development
TRI	Toxics Release Inventory
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service

1 Introduction

The Montana Department of Transportation (MDT) launched the US 2/MT 16 Transportation Regional Economic Development (TRED) Study to examine whether four-lane highway improvements can be justified by economic and safety considerations. The Study's focus is on the federally-named Theodore Roosevelt Expressway (TRE). The Montana segment of the TRE includes US 2 from the North Dakota state line to Culbertson, Montana, then north on MT 16 to the Port of Raymond (Figure 1).

The TRED Study will assess future opportunities that might indicate the need for highway expansion in the area. Trade areas are being assessed at the corridor level, as well as regionally and internationally. The Study includes an environmental scan process that is reported in this document.

1.1 Scope and Purpose

The purpose of an environmental scan during a corridor study is to provide an initial understanding of potential environmental issues that could influence the development of improvement alternatives along the corridor as a project moves forward. Environmental resources are protected by Federal, state, and local laws. The objective of the environmental scan is to review existing environmental conditions in the project area and identify constraints that may influence project development.

The environmental scan process consisted of support meetings and/or comment opportunities with agency representatives, compilation and review of environmental databases, and a field reconnaissance of the US 2/MT 16 TRED corridor. The reconnaissance of the corridor was conducted on August 1 and 2, 2006.

Agencies consulted during the environmental scan process include:

- Montana Department of Transportation
- United States Environmental Protection Agency
- United States Army Corps of Engineers
- United States Fish and Wildlife Service (including Medicine Lake National Wildlife Refuge)
- Montana Department of Fish, Wildlife, and Parks

1.2 Background

The TRE in Montana is a major thoroughfare not only for eastern Montana, but for the region surrounding it. This corridor serves international and interstate commerce and travel. MT 16 is the primary north/south corridor in eastern Montana, connecting Interstate 90 with Canada. US 2 is a major east/west corridor across northern Montana.

The primary objective of the TRED Study is to identify what economic, regulatory, or operational changes would result in traffic and safety conditions that would warrant building a 4-lane road on the TRE in Montana.

Secondary objectives of the TRED Study include the following:

- Assess existing regional economic conditions and development opportunities
- Develop traffic growth forecast and freight volume projections under existing development plans and economic opportunities
- Develop traffic growth forecast and freight volume projections with induced economic development and travel demand
- Conduct sensitivity analysis and risk analysis to facilitate consensus building
- Engage local stakeholders and the general public

The TRED Study will include the documentation of existing conditions, including this environmental scan, as well as an assessment of alternatives, forecasts of population and traffic, econometric analysis of roadway improvements, development of alternatives and recommendations, and a comprehensive public involvement process.

1.3 Organization of Report

This report goes on to describe the geographic setting of the existing US 2 and MT 16 corridors in the study area (Section 2). The document continues with descriptions of environmental scan methodologies and results for each geographic area for physical resources (Section 3), biological resources (Section 4), cultural resources (Section 5), and utilities (Section 6). Figures for the report may be found in Appendix A. Photos of the study corridor are included in Appendix B. A list of acronyms is defined on page v.

2 Geographic Setting

For the purpose of this environmental scan, the project has been divided into four segments (Figure 1):

- US 2 – North Dakota State Line to Culbertson (MP 669.5 – 644.5)
- MT 16 – Culbertson to Medicine Lake (MP 86.25 – 64)
- MT 16 – Medicine Lake to Plentywood (MP 64 – 41.25)
- MT 16 – Plentywood to the Canadian Border (MP 0 – 15.5)

The following sections will describe these segments.

2.1 US 2 – North Dakota State Line to Culbertson

The US 2 corridor from the North Dakota state line to Culbertson extends from approximately milepost (MP) 669.5 at the North Dakota state line west to approximately MP 644.5 at the intersection with MT 16 in Culbertson. The corridor passes rolling and grassy terrain, most of which is agricultural, with some wetland areas. There are a few oil drilling and storage operations, particular near MP 658. Railroad tracks approach the corridor from the south near MP 659 and follow the corridor closely west into Culbertson. Culbertson is the largest community along this corridor, and Bainville is a smaller community located near MP 659.

2.2 MT 16 – Culbertson to Medicine Lake

The MT 16 corridor from Culbertson to Medicine Lake extends from the intersection with US 2 in Culbertson at approximately MP 86.25 through the town of Medicine Lake, at approximately MP 64. The corridor passes through flat to rolling grassy terrain, most of which is agricultural including some potentially historic farms. There are several wetland areas located within the corridor. The Medicine Lake National Wildlife Refuge (NWR) is located at approximately MP 66. The communities located in this corridor include Culbertson (MP 86), Froid (MP 75.5), and Medicine Lake (MP 64).

There are many Block Management Areas (BMA) located throughout the corridor, managed by the Montana Department of Fish, Wildlife, and Parks (MFWP). The Block Management program is a cooperative effort among private and some public landowners, MFWP, and hunters. The program seeks to: 1) maintain public hunting access to private and isolated public lands; 2) help landowners manage public hunting and provide benefits to offset impacts like increased road maintenance and weed control; and 3) help MFWP manage wildlife.

2.3 MT 16 – Medicine Lake to Plentywood

The MT 16 corridor from Medicine Lake to Plentywood extends from approximately MP 64 on the north side of Medicine Lake through the town of Plentywood to the intersection with MT 5 at approximately MP

41.25. The corridor passes through flat to rolling grassy terrain, most of which is agricultural including some potentially historic farms. There are some bluffs located on the east side of the highway near MP 53. There are several wetland areas and BMAs located within the corridor. Oil production and storage is present throughout the segment; of particular note is a location with several oil tanks and a sludgy pond on the west side of the highway near MP 62.

The communities located in this corridor include Reserve (approximately 0.75 miles west of MP 56 near the railroad), Antelope (MP 50), and Plentywood (MP 42). Plentywood is a relatively large community, and includes residential, commercial, and some industrial areas.

2.4 MT 16 – Plentywood to the Canadian Border

Milepost markers on MT 16 are reset to zero at the intersection with MT 5 on the north side of Plentywood. The MT 16 corridor from Plentywood to the Canadian border extends from that intersection at MP 0, to the Canadian border at approximately MP 15.5. The corridor passes through rolling grassy terrain, most of which is agricultural including some potentially historic farms. There are several wetland areas associated with glacial potholes located within this segment.

There is some commercial and industrial land use for the first quarter-mile north of Plentywood. There is a golf course located at MP 0.5. The communities located in this corridor include Plentywood (MP 0) and Raymond (MP 7).

3 Physical Resources

3.1 Land Ownership

The TRED project display of public ownership in the Study Area (Appendix F) was reviewed for land ownership by private, Federal, and state entities along the study corridor. Refer to Figure 2 for an overview of land ownership in the study corridor.

MDT compiled aerial photographs of six communities in the corridor with overlays of a 4-lane right-of-way (ROW), so that preliminary impacts to these communities could be assessed from expanding the roads to 4-lanes. An urban section with a 58-foot ROW was assumed for Culbertson, Medicine Lake, and Plentywood. A rural section with a 110-foot ROW was assumed for Bainville, Froid, and Antelope. These aerials were reviewed and discussions of preliminary community impacts are included in the following sections. These discussions are preliminary in nature, and are not intended to substitute for full socioeconomic impact analyses.

Reviews were also conducted to determine the presence of Section 4(f) and Section 6(f) properties along the corridor. Section 4(f) refers to the original section within the Department of Transportation Act of 1966, which set the requirement for consideration of park and recreational lands, wildlife and waterfowl refuges, and historic sites in transportation project development. Prior to approving a project that "uses" a Section 4(f) resource, the Federal Highway Administration (FHWA) must find that there is no prudent or feasible alternative that completely avoids 4(f) resources. "Use" can occur when land is permanently incorporated into a transportation facility or when there is a temporary occupancy of the land that is adverse to a 4(f) resource. Constructive "use" can also occur when a project's proximity impacts are so severe that the protected activities, features, or attributes that qualify a resource for protection under 4(f) are "substantially impacted". (HDR, 2006) Section 4(f) resource information was gathered by field observation and review of the National Register of Historic Places (NRHP) list for Roosevelt and Sheridan counties. It can also be assumed that each of the small communities in the study corridor likely has its own park or recreation facility, in addition to historic sites that may not be listed on the NRHP. It should be noted that potential 4(f) sites that were identified using the NRHP and windshield observations of recreational areas are not intended to substitute for an extensive 4(f) evaluation. Formal 4(f) evaluations will have to be conducted prior to any land acquisition or construction along the highway corridor.

Section 6(f) of the Land and Water Conservation Funds Act applies to all projects that impact recreational lands purchased or improved with land and water conservation funds. The Secretary of the Interior must approve any conversion of property acquired or developed with assistance under this act to other than public, outdoor recreation use (ITD, 2006). 6(f) resource information for Roosevelt and Sheridan counties was collected from MFWP.

3.1.1 US 2 – North Dakota State Line to Culbertson

According to the Public Ownership map created for the TRED Study Area in July 2006 (Appendix F), the US 2 – North Dakota State Line to Culbertson segment is predominantly privately owned. There are scattered tracts of Montana State Trust Lands and Turtle Mountain Allotted Lands, which is tribal land for the Turtle Mountain Chippewa Indians. There are only a few tracts of Bureau of Land Management (BLM) land, mainly to the south.

The 110-foot ROW overlay in Bainville shows very little impacts to residences. Most of the ROW to be acquired is agricultural land. The frontage of two residences and the driveway for another will be slightly impacted.

The 58-foot ROW overlay in Culbertson shows slightly more impact to residential areas. To avoid parks (4(f) resources) along the MT 16 corridor in Culbertson, there may be more residential frontage converted to ROW. It is difficult to assess at this stage whether any structures would be affected, but it is possible.

4(f) resources in this corridor segment are summarized in Table 1.

Table 1. 4(f) Resources within the US 2 - North Dakota State Line to Culbertson Segment

Name	Type of 4(f) Resource	Town (Specific Location Relative to Corridor)	Additional Information (Photo Reference)
Hale's Filling Station and Grocery (Lanark town site)	Historic Site – listed on NRHP	Bainville (Approx. MP 653.5 - ¼ - ½ mile north of US 2)	Listed 8/16/1994, NRHP Reference No. 94000864 (no photo available)

According to MFWP data, no 6(f) resources are located in this corridor segment.

3.1.2 MT 16 – Culbertson to Medicine Lake

According to the Public Ownership map for the TRED Study Area (Appendix F), the MT 16 – Culbertson to Medicine Lake segment is predominantly privately owned. The Fork Peck Indian Reservation is generally located 1-5 miles west of the highway. There are a few scattered tracts of Montana State Trust Lands and two tracts of BLM land. U.S. Fish and Wildlife Service (USFWS) land associated with the Medicine Lake NWR is noticeable at Medicine Lake, Homestead Lake, and Johnson Lake.

As discussed for the US 2 portion of Culbertson, the 58-foot ROW overlay in Culbertson shows some impact to residential areas. To avoid parks (4(f) resources) along the MT 16 corridor in Culbertson, there may be more residential frontage converted to ROW. It is difficult to assess at this stage whether any structures would be affected, but it is possible.

The 110-foot ROW in Froid does not impact as much residential land, as neighborhoods are generally located away from the highway. Mainly agricultural frontage is impacted, with some minor impacts to a few residences.

The 58-foot ROW overlay in Medicine Lake shows some impact to residential areas. Much of the residential neighborhoods are located off of the highway, but there are several residences that would be affected by roadway widening. It is difficult to assess at this stage whether any structures would be affected, but it is possible.

4(f) resources in this corridor segment are summarized in Table 2.

Table 2. 4(f) Resources within the MT 16 – Culbertson to Medicine Lake Segment

Name	Type of 4(f) Resource	Town (Specific Location Relative to Corridor)	Additional Information (Photo Reference)
Culbertson school area	Park	Culbertson (Northwest corner of MT 16 and US 2 junction)	Observed playground and ball fields on northeast corner of MT 16 and US 2 (see Appendix A, photo 74)
Fjeseth Field	Park	Froid (Main and MT 16)	Observed baseball field in Froid (see Appendix A, photo 19)
Medicine Lake NWR	Wildlife Refuge	Medicine Lake (MT 16 crosses refuge at MP 65.5)	Encompasses Medicine Lake, Homestead Lake, and Johnson Lake (see Appendix A, photos 22-26)
Tipi Hills	Historic Site – listed on NRHP	Medicine Lake (address restricted)	Listed 8/1/1975, NRHP Reference No. 75001085 (no photo available)

6(f) resources located in this corridor segment are summarized in Table 3.

Table 3. 6(f) Resources within the MT 16 – Culbertson to Medicine Lake Segment

Name	Town
Culbertson Schools Recreation Complex	Culbertson
Culbertson Swimming Pool (3 listings)	Culbertson
Culbertson Bicentennial Park	Culbertson
Froid City Park	Froid
Medicine Lake Town Park	Medicine Lake
Medicine Lake Pool and Park	Medicine Lake

3.1.3 MT 16 – Medicine Lake to Plentywood

According to the Public Ownership map for the TRED Study Area (Appendix F), the MT 16 – Medicine Lake to Plentywood segment is predominantly privately owned. The Fork Peck Indian Reservation is generally located 1-3 miles west of the highway. There are a few scattered tracts of Montana State Trust Lands. There are a few tracts of Turtle Mountain Allotted Lands, which are tribal lands.

The 110-foot ROW overlay in Antelope shows some impact to residential areas. The residential neighborhoods of this community are located adjacent to the highway, and several residences would be

impacted by roadway widening. Most of the structures appear to be set back far enough from the existing roadway that impacts to structures is not anticipated at this stage.

The 58-foot ROW overlay in Plentywood shows the most impact to residential and commercial areas. Several residential neighborhoods and commercial areas are located adjacent to the existing highway. It is difficult to assess at this stage whether any structures would be affected, but it is possible.

4(f) resources in this corridor segment are summarized in Table 4.

Table 4. 4(f) Resources within the MT 16 – Medicine Lake to Plentywood Segment

Name	Type of 4(f) Resource	Town (Specific Location Relative to Corridor)	Additional Information (Photo Reference)
Unnamed Playground at Mill Street	Park	Plentywood (Northeast corner of MT 16 and Mill Rd)	Observed in field - private or public status unclear (see Appendix A, photo 49)
Ball field complex	Park	Plentywood (Between Robert and Maple Streets, ¼ mile south of MT 16 at MP 42.25)	Observed in field (no photo available)

6(f) resources located in this corridor segment are summarized in Table 5.

Table 5. 6(f) Resources within the MT 16 – Medicine Lake to Plentywood Segment

Name	Town
Plentywood City Park (2 listings)	Plentywood

3.1.4 MT 16 – Plentywood to the Canadian Border

According to the Public Ownership map for the TRED Study Area (Appendix F), the MT 16 – Plentywood to the Canadian Border segment is predominantly privately owned. There are a few scattered tracts of Montana State Trust Lands.

The 58-foot ROW overlay in Plentywood shows the most impact to residential and commercial areas. The portion of this segment that travels north from the intersection with MT 5 mainly impacts commercial areas. Residential neighborhoods in this area are located off of the highway. It does not appear likely at this stage that any structures would be affected.

4(f) resources in this corridor segment are summarized in Table 6.

Table 6. 4(f) Resources within the MT 16 – Plentywood to the Canadian Border Segment

Name	Type of 4(f) Resource	Town (Specific Location Relative to Corridor)	Additional Information (Photo Reference)
Plentywood Golf Course	Park	Plentywood (East side of MT 16, approx. MP 0.5)	Observed in field (no photo available)

Raymond Grain Elevators Historic District	Historic Site – listed on NRHP	Raymond (Syme Ln, approx ¼ mile west of MT 16 at MP 7)	Listed 10/27/1993, NRHP Reference No. 93001148 (no photo available)

6(f) resources located in this corridor segment are summarized in Table 7.

Table 7. 6(f) Resources within the MT 16 – Plentywood to the Canadian Border Segment

Name	Town
Plentywood Golf Course	Plentywood

3.2 Geology and Soils

Information was obtained on geology and soils to determine the presence of prime farmland, geologic faults, and potential geologic hazard areas with regard to road-building in the corridor study areas.

Prime farmland soils are those that have the best combination of physical and chemical characteristics for producing food, feed, and forage; the area must also be available for these uses. Prime farmland can be either non-irrigated or lands that would be considered prime if irrigated. Federal programs are required to minimize the unnecessary and irreversible conversion of farmland to nonagricultural uses and should be compatible with policies to protect farmland.

Information regarding areas of prime farmland in the corridor area was compiled from the US Department of Agriculture, Natural Resource Conservation Service. Figures 3 through 6 depict prime farmland and general geologic features in the study corridor.

Available Geographic Information System (GIS) information was reviewed for fault lines and seismic hazard areas. This geologic information can help determine any potential design and construction issues related to embankments and bridge design. The following paragraphs describe the geologic and prime farmland soils findings for each segment of the corridor.

3.2.1 US 2 – North Dakota State Line to Culbertson

Geologic and prime farmland features for this segment are presented in Figure 3. Approximately half of the corridor in this segment passes through land designated as either Prime Farmland If Irrigated or Farmland of Statewide Importance. No fault lines are visible in this segment. It appears as though this segment passes through an area of low seismic hazard.

3.2.2 MT 16 – Culbertson to Medicine Lake

Geologic and prime farmland features for this segment are presented in Figures 4 and 5. There is virtually no land designated as either Prime Farmland If Irrigated or Farmland of Statewide Importance within a mile of MT 16 from Culbertson (approximate MP 88) to MP 72. The only exception in this area is a very small portion of Prime Farmland If Irrigated approximately 0.75 miles west of the highway at MP 84.5. The remainder of this segment, from MP 72 to MP 64 is almost entirely mapped in Prime Farmland If Irrigated and Farmland of Statewide Importance.

This segment passes through a fault line at approximately MP 72.25. This fault line runs in a northeast-southwest direction from south of Homestead Lake through the east side of Medicine Lake and beyond. No areas of seismic hazard are visible on the map in this segment.

3.2.3 MT 16 – Medicine Lake to Plentywood

Geologic and prime farmland features for this segment are presented in Figures 5 and 6. Approximately half of the corridor in this segment passes through land designated as either Prime Farmland If Irrigated or Farmland of Statewide Importance. No fault lines or seismic hazard areas are visible in this segment.

3.2.4 MT 16 – Plentywood to the Canadian Border

Geologic and prime farmland features for this segment are presented in Figure 6. Approximately half of the corridor in this segment passes through land designated as either Prime Farmland If Irrigated or

Farmland of Statewide Importance. No fault lines are visible in this segment. It appears as though this segment passes through an area of low seismic hazard.

3.3 Surface Water and Groundwater

Available GIS data were reviewed and field observations made to identify the location of surface water bodies within the corridor study area, including rivers, streams, lakes, or reservoirs.

Information on streams within the study area was obtained from the Montana Department of Environmental Quality (MDEQ). Section 303, subsection "d" of the Clean Water Act requires the State of Montana to develop a list, subject to U.S. Environmental Protection Agency (USEPA) approval, of water bodies that do not meet water quality standards. When water quality fails to meet state water quality standards, MDEQ determines the causes and sources of pollutants in a subbasin assessment and sets maximum pollutant levels, called total maximum daily loads (TMDL) (MDEQ, 2006).

The federal Corps of Engineers (COE) notes that that agency is responsible to review transportation projects to ensure compliance with the federal Clean Water Act. The agency has permitting authority whenever highway projects intersect wetlands under its jurisdiction, and provides coordinated review by the federal Fish and Wildlife Service and others. Generally, COE may elect to use a simpler, national permit if (a) FHWA finds the project is categorically excluded from detailed NEPA review, or (b) if no wetland fill is proposed that exceeds 0.50 acres. Alternatively, the COE conducts a project specific analysis, and evaluates alternatives against its own assessment of project purpose and needs to identify the least environmentally damaging practicable alternative. The COE commented, "If MDT ultimately submits an alternative other than the least damaging practicable alternative for a permit, denial is the likely outcome." Therefore, if an individual permit is required by the COE, it would be important for MDT, FHWA, and COE to coordinate on the purpose and need statement, the identification of alternatives carried forward for further review and selection of the preferred alternative to ensure compatibility of the National Environmental Policy Act and Clean Water Act documents.

A TMDL sets maximum pollutant levels in a watershed. The TMDLs become the basis for implementation plans to restore the water quality to a level that supports its designated beneficial uses. The implementation plans identify and describe pollutant controls and management measures to be undertaken (such as best management practices), the mechanisms by which the selected measures would be put into action, and the individuals and entities responsible for implementation projects. A TMDL has not yet been written for this watershed. When one is prepared and an implementation plan is in place, any construction practices would have to comply with the requirements set forth in the plan.

The study corridor travels through two watersheds:

- The Charlie-Little Muddy watershed (Hydrologic Unit Code: 10060005)
- The Big Muddy watershed (Hydrologic Unit Code: 10060006)

The Charlie-Little Muddy watershed is listed in the Final 2004 Integrated 303(d)/305(b) Report by MDEQ. The Charlie-Little Muddy watershed was listed as a Category 5 watershed, meaning that one or more applicable beneficial uses have been assessed as being impaired or threatened, and a TMDL is required to address the factors causing the impairment or threat. Beneficial uses that apply to this watershed include aquatic life, warm fisheries (non-salmonid), drinking water sources, recreation, agriculture, and industry. Probable causes of impairment include thermal modification and flow alteration by hydromodification and flow regulation/modification.

The Big Muddy watershed is also listed in the Final 2004 Integrated 303(d)/305(b) Report by MDEQ and is also listed as a Category 5 watershed. Beneficial uses that apply to this watershed include aquatic life, warm fisheries (non-salmonid), and recreation. Probable causes and sources of impairment are summarized in Table 8.

Table 8. 303(d) Listing Summary for the Big Muddy Watershed

Waterbody Segment	Probable Causes of Impairment	Probable Sources of Impairment
Big Muddy Creek from the northern Fort Peck Reservation boundary to the mouth (Missouri River)	• Siltation • Flow alteration • Other habitat alterations • Riparian degradation • Nutrients	• Agriculture • Grazing related sources • Flow regulation/modification • Hydromodification
Big Muddy Creek from Canada to the northern boundary of the Fort Peck Indian Reservation	• Nutrients • Organic enrichment/Low dissolved oxygen • Other habitat alterations • Riparian degradation • Metals • Copper • Lead • Mercury • Zinc	• Agriculture • Crop-related sources • Grazing related sources

River systems were also reviewed to determine 'Wild and Scenic' designation. The Wild and Scenic Rivers Act, created by Congress in 1968, provided for the protection of certain selected rivers, and their immediate environments, that possess outstandingly remarkable scenic, recreational, geologic, fish and wildlife, historic, cultural, or other similar values. The U.S. National Park Service (NPS) website was accessed for information on river segments that may be located within the study area with wild and scenic designation. No Wild and Scenic Rivers have been designated within the study corridor (NPS, 2006).

Public water supplies were researched via the Digital Atlas of Montana, by searching a 1 mile radius around the applicable highway (MNRIS, 2006). Public water supplies are researched in the environmental scan to identify areas where additional protection for drinking water supplies could be required during construction. Public water supplies will be discussed for each segment in the following sections.

A sole source aquifer is one that has been designated by the USEPA as the sole or principal source of drinking water for an area. As such, designated sole source aquifers receive special protection. No sole source aquifers have been designated anywhere in the study corridor (USEPA, 2006b).

3.3.1 US 2 – North Dakota State Line to Culbertson

Figure 7 presents surface water features in the US 2 North Dakota State Line to Culbertson segment. Table 9 summarizes GIS data and field observations made in this segment for regarding surface water resources.

Table 9. Surface Water in the US 2 - North Dakota State Line to Culbertson Segment

Approximate Milepost	Description
645-648	The highway crosses Clover Creek several times

Approximate Milepost	Description
646	Missouri River passes within approximately 1.5 miles south of US 2 in the town of Culbertson
649	Highway crossing of Little Muddy Creek from north
652	Highway crossing of Redbank Creek from north
655	Highway crossing of unnamed intermittent creek
657-659	Several meandering channels of Shotgun Creek on north side of highway, including at least 2 crossing the highway
659	Shotgun Creek crosses the highway several times and passes through the town of Bainville
659	Shotgun reservoir is located approximately 1.5 miles north of the highway
660	The highway crosses an unnamed intermittent creek, which then flows along the south side of the highway from approximately mileposts 660-661
661.5	Highway crossing of unnamed intermittent creek
663.5	Highway crossing of unnamed intermittent creek
664.5	Highway crossing of unnamed intermittent creek
666	Highway crossing of unnamed intermittent creek

This corridor segment is located in the Charlie-Little Muddy watershed (Hydrologic Unit Code: 10060005) (USEPA, 2006a). This watershed and its 303(d) listing status are discussed in Section 3.3.

Public water supplies found within one mile of this segment include the Town of Culbertson and the State Line Casino in Bainville. The information is summarized in Table 10.

Table 10. Public Water Supplies in the US 2 - North Dakota State Line to Culbertson Segment

Owner Name	Source Name	Source Type	City	Resident Population Served	Non-Res Population Served	PWS ID
Town of Culbertson	Plant Reservoir	Surface Water	Culbertson	796	0	MT0000192
Town of Culbertson	Missouri River	Surface Water	Culbertson	796	0	MT0000192
State Line Casino	Well #1	Groundwater	Bainville	0	30	MT0001640

3.3.2 MT 16 – Culbertson to Medicine Lake

Figures 8 and 9 present surface water features in the MT 16 – Culbertson to Medicine Lake segment. Table 11 summarizes GIS data and field observations made for this segment regarding surface water resources.

Table 11. Surface Water in the MT 16 – Culbertson to Medicine Lake Segment

Approximate Milepost	Description
83	Highway crossing of unnamed intermittent creek
76	Highway crossing of Sheep Creek, a tributary to Homestead Lake (part of Medicine Lake NWR)
73	Highway crossing of Lost Creek, a tributary to Homestead Lake (part of Medicine Lake NWR)
72	Highway crossing of McCabe Creek, a tributary to Lost Creek and Homestead Lake
71-69	Highway crosses several unnamed intermittent drainages
65.5	Highway crosses Medicine Lake (part of Medicine Lake NWR)

The first three miles approximately north of Culbertson are located within the Charlie-Little Muddy watershed. The remainder of this corridor segment is located in the Big Muddy watershed. These watersheds and their 303(d) listing status are discussed in Section 3.3.

Medicine Lake and its surrounding water impoundments are dependent on runoff provided from spring snowmelt and heavy summer thundershowers. The two main tributaries are Lake Creek to the northeast and Big Muddy Creek to the north. (USFWS, 1992)

Public water supplies found within one mile of this segment includes the Medicine Lake NWR. The information is summarized in Table 12.

Table 12. Public Water Supplies in the MT 16 – Culbertson to Medicine Lake Segment

Owner Name	Source Name	Source Type	City	Resident Population Served	Non-Res Population Served	PWS ID
Medicine Lake NWR	Well	Groundwater	Medicine Lake	7	50	MT0003713

3.3.3 MT 16 – Medicine Lake to Plentywood

Figures 9 and 10 present surface water features for the MT 16 – Medicine Lake to Plentywood segment. Table 13 summarizes GIS data and field observations made for this segment regarding water resources.

Table 13. Surface Water in the MT 16 – Medicine Lake to Plentywood Segment

Approximate Milepost	Description
63-47	Big Muddy Creek flows north-south within 1-2 miles west of highway. It serves as the Fort Peck Indian Reservation border in many areas
63-59	Highway crosses several unnamed intermittent drainages
60-53	Reserve Creek flows north-south within 0-1.5 miles west of highway
57-55	Highway crosses several unnamed intermittent drainages
51.5	Highway crossing of Antelope Creek

Approximate Milepost	Description
47	Highway crossing of unnamed intermittent creek
46.5	Highway crossing of Ator Creek
42	Highway crossing of unnamed intermittent drainage at Mill St.

This corridor segment is located in the Big Muddy watershed. This watershed and its 303(d) listing status are discussed in Section 3.3.

Public water supplies found within one mile of this segment are summarized in Table 14.

Table 14. Public Water Supplies in the MT 16 – Medicine Lake to Plentywood Segment

Owner Name	Source Name	Source Type	City	Resident Population Served	Non-Res Population Served	PWS ID
Reserve Bar	Well	Groundwater	Reserve	0	30	MT0002040
Antelope Water and Sewer	Well #1	Groundwater	Antelope	58	0	MT0003203
Antelope Water and Sewer	Well #2	Groundwater	Antelope	58	0	MT0003203
Plentywood Water Dept	Well #10	Groundwater	Plentywood	2,136	0	MT0000306
Plentywood Water Dept	Well #10a	Groundwater	Plentywood	2,136	0	MT0000306
Blue Moon	Well #1	Groundwater	Plentywood	0	150	MT0001664
Dr Debelle	Well #2	Groundwater	Plentywood	0	50	MT0001669
Zeidler Hardware	Northeast MT Water Cond	Purchased	Plentywood	0	50	MT0003680

3.3.4 MT 16 – Plentywood to the Canadian Border

Figure 10 presents surface water features in the MT 16 – Plentywood to the Canadian Border segment. Table 15 summarizes GIS data and field observations made for this segment regarding surface water resources.

Table 15. Surface Water in the MT 16 – Plentywood to the Canadian Border Segment

Approximate Milepost	Description
1	Box Elder Reservoir is 1 mile east of highway
2.5	Unnamed intermittent drainage on the east side of the highway
4	Highway crossing of unnamed intermittent drainage
5.5	Highway crossing of unnamed intermittent drainage
7	Highway crossing of McCoy Creek
7-12	Scattered medium to small intermittent and/or perennial surface water ponds (potholes) on both sides of highway, mainly on west side
12-15	Scattered small intermittent and/or perennial surface water ponds (potholes) on both sides of highway

This corridor segment is located in the Big Muddy watershed. This watershed and its 303(d) listing status are discussed in Section 3.3.

Public water supplies found within one mile of this segment are summarized in Table 16.

Table 16. Public Water Supplies in the MT 16 – Plentywood to the Canadian Border Segment

Owner Name	Source Name	Source Type	City	Resident Population Served	Non-Res Population Served	PWS ID
Raymond Border Sta	New Well #2	Groundwater	Raymond	14	25	MT0002767

3.4 Floodplains and Floodways

Floodplains are land areas adjacent to rivers and streams that are subject to recurring inundation. Because of their connection to river systems, floodplains often contain wetlands and other areas vital to a diverse and healthy ecosystem. The floodway is the channel of a river or watercourse and the adjacent land areas that must be reserved in order to discharge the 100-year flood without cumulatively increasing the water surface elevation more than one foot. Floodways are only delineated in communities where detailed hydraulic analyses have been completed. The floodway is contained within the floodplain.

Flood insurance rate maps (FIRMs) define the regulatory boundaries of floodplains along the rivers or streams where FIRM studies have been conducted. These flood insurance studies are maintained by the Federal Emergency Management Agency (FEMA) to determine the "existence and severity of flood hazards" and to help administer both the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973.

Federal laws regulating floodplain and flood impacts are contained within the National Flood Insurance Program (NFIP), a program managed by FEMA. Through the NFIP, FEMA has established minimum federal standards for floodplain regulation that are administered locally by cities and counties, with state oversight. Project related activities within the floodway would be required to demonstrate that any rise in the 100-year flood elevation following the project would be allowable under the NFIP.

Floodplain information was downloaded where available and used to identify mapped flood zones (Figures 7 through 10). GIS-based FEMA flood maps are available primarily along US 2 is association with the Missouri River. The study corridor passes through these flood zones near Culbertson (MP 645). MT-16 passes through a mapped flood zone just north of Culbertson near MP 88. This is likely a tributary to the Missouri River that passes through the area. MT-16 passes by, but does not cross, two mapped flood zones near the Town of Froid (MP 76 and MP 73). These flood zones are located on the west side of the highway, associated with Sheep Creek and Lost Creek, respectively. These creeks are tributaries to Homestead Lake.

The incorporated Town of Culbertson is not included in GIS-based FEMA flood mapping. A FIRM was downloaded from the FEMA map website (map 300067B, dated May 15, 1986) and reviewed for flood zones mapped within the study corridor as it passes through Culbertson (Appendix E). A floodplain (Flood Zone A) is mapped at the intersection of US 2 and MT 16 and surrounding areas. This floodplain continues north on MT 16 to the limits of Culbertson at 8th Street North and east on US 2 to 2nd Avenue East.

No FEMA floodplains are mapped in Sheridan County in or near the study corridor.

It should be noted that potential floodplains that were identified using FEMA maps are not intended to substitute for an extensive calculation of floodplain impacts. Potential floodplain impacts will have to be assessed prior to any construction along the highway corridor.

3.5 Wetlands

The U.S. Army Corps of Engineers defines wetlands as those areas that are inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas.

USFWS defines wetland as 'lands transitional between terrestrial and aquatic systems where the water table is usually at or near the surface or that land is covered by shallow water.' Wetlands must have one or more of the following three attributes:

- At least periodically, the land supports hydrophytes (a plant adapted to growing in or under the surface of water);
- The substrate is predominantly undrained hydric soil; and
- The substrate is non-soil and is saturated with water or covered by shallow water at some time during the growing season of each year.

The U.S. Army Corps of Engineers requires that all three of the above attributes be present for an area to be considered a wetland, and for the wetland to by hydraulically connected to a Water of the US for it to be considered under the jurisdiction of Clean Water Act. This will be the definition with which future highway planning would be concerned. Digitally available wetlands maps, however, were only available at this planning stage from the USFWS, and therefore the USFWS definition of a wetland is applicable when referring to Figures 7 through 10 of this document.

The USFWS produces and provides information on the characteristics, extent, and status of the Nation's wetlands and deepwater habitats and other wildlife habitats, known as the National Wetland Inventory (NWI). NWI information was used in the study corridor to identify riverine and palustrine wetlands along the corridor. Riverine wetlands are associated with rivers and streams. Palustrine wetlands may be isolated or connected wet areas and include marshes, swamps, and bogs.

The study corridor is located within the highly productive prairie pothole region that extends from southern Canada through northeast Montana, the Dakotas, and western Minnesota. The region contains many thousands of small wetlands that produce over 50 percent of the waterfowl originating in the contiguous United States. Marshes, shelterbelts, croplands, grasslands, and large water bodies provide both migration and nesting habitat for a vast array of wildlife. (USFWS, 1992)

The Northeastern Montana Wetlands Management District, managed by Medicine Lake NWR staff, consists of over 40 separate waterfowl production areas totaling in excess of 10,000 acres in a three-county area. These areas have been acquired and are intensively managed primarily for waterfowl production. An additional 7,500 privately-owned wetland acres within the district are also protected from burning, fill, and drainage by perpetual wetland easements with private landowners. (USFWS, 1992)

Drought occurs periodically in this region. This drying of wetland basins is important to maintain the productivity of the wetlands. Nutrients that are accumulated in dead plant matter decompose in the presence of oxygen and return to the soil. With the return of the wet cycle comes an increased growth of aquatic vegetation and invertebrates. (USFWS, 1992)

NWI maps were reviewed in conjunction with field reconnaissance conducted along the corridor. Field reconnaissance helped to confirm or deny the presence of NWI wetlands and identify some that were not mapped. Field reconnaissance for wetlands included observations from the roadway for vegetation, hydrology, and local topography. It should be noted that potential wetlands that were identified using NWI

maps and windshield observations are not intended to substitute for wetland delineation. Wetland delineation will have to be conducted prior to any construction along the highway corridor.

3.5.1 US 2 – North Dakota State Line to Culbertson

A summary of wetlands identified through NWI maps and field observations for the US 2 – North Dakota State Line to Culbertson segment is presented in Table 17. Figure 7 presents wetlands mapped in this segment.

Table 17. Wetlands in the US 2 – North Dakota State Line to Culbertson Segment

Approximate Milepost	Description
648	An area on the north side of the highway mapped as wetlands
649-655	Large tracts of wetland areas are located on the south side of the highway, much associated with Clover Creek
650	A small mapped palustrine wetland area on the north side of the highway was not observed in the field
652-653	Some observed wet areas between the highway and the railroad (unmapped), in addition to riverine wetland areas on both sides of the highway
656-659	Scattered tracts of wetland areas within 1 mile of north side of highway
658.5-659	Large mapped wetland area on north side of highway
660-668	Many wetland areas associated with creeks and drainages
664.5	Wet ponded area (unmapped) observed on north side of highway
666	Wet area (unmapped) observed on north side of highway, and mapped wetland area observed on south side of highway

3.5.2 MT 16 – Culbertson to Medicine Lake

A summary of wetlands identified through NWI maps and field observations for the MT 16 – Culbertson to Medicine Lake segment is presented in Table 18. Figures 8 and 9 present wetlands mapped in this segment.

Table 18. Wetlands in the MT 16 – Culbertson to Medicine Lake Segment

Approximate Milepost	Description
88-84	Some small wetland areas associated with drainages
85-84	Wet area (unmapped) observed on east side of highway
84	Potential wet areas (unmapped) observed on both sides of highway associated with drainages
83	Wet areas (mapped and unmapped) observed crossing highway associated with a drainage
83-81	Scattered wetland areas within 1 mile of alignment
82-81.5	Mapped wetlands from west and along east side of highway not observed in field

Approximate Milepost	Description
79.5	Large wetland area approx. 1 mile east of highway
79	Wet area (unmapped) observed on east side of highway
78-77	Scattered wetland pothole areas within 1 mile of alignment
74	Wet area (unmapped) observed on west side of highway; feeds into mapped wetland area with duck boxes on east side of highway
72	Wet area (unmapped) observed crossing the highway toward Homestead Lake
71	Wet areas associated with small drainage on east side of highway
70.5	Wet area (unmapped) observed crossing the highway
65.5	Medicine Lake and associated wetland areas

3.5.3 MT 16 – Medicine Lake to Plentywood

A summary of wetlands identified through NWI maps and field observations for the MT 16 – Medicine Lake to Plentywood segment is presented in Table 19. Figures 9 and 10 present wetlands mapped in this segment.

Table 19. Wetlands in the MT 16 – Medicine Lake to Plentywood Segment

Approximate Milepost	Description
63-47	Wetland areas associated with Reserve and Big Muddy Creeks
62	Wet area (unmapped) observed crossing highway
60.5	Potential wet area (unmapped) observed crossing highway
60	Wet area (unmapped) observed on the west side of the highway
59.5	Potential wet area (unmapped) observed crossing highway
59	Small wetland area 0.5 mile west of highway
59-54	Few very small wetland pothole areas on east side of highway
53	Wet area associated with drainage from bluffs (unmapped) observed crossing highway
50-49	Few very small wetland pothole areas on east side of highway
48.5-48	Potential wet areas (unmapped) observed crossing highway
45	Mapped wetland area associated with drainage on east side of highway observed to extend to road (extended area unmapped)
42	Broad area of wetlands south of highway in Plentywood

3.5.4 MT 16 – Plentywood to the Canadian Border

A summary of wetlands identified through NWI maps and field observations for the MT 16 – Plentywood to the Canadian Border segment is presented in Table 20. Figure 10 presents wetlands mapped in this segment.

Table 20. Wetlands in the MT 16 – Plentywood to the Canadian Border Segment

Approximate Milepost	Description
2.5	Potential wet area (unmapped) observed on east side of highway
4	Potential wet areas (unmapped) observed crossing highway
1-6	Scattered pothole wetlands on both sides of the highway
4	Some wetland areas (unmapped) observed crossing highway
5.5	Some wetland areas crossing highway
11	Mapped wetland area on west side of highway is hayed
12	Mapped wetland area on west side of highway is hayed
7	Wetland crossing highway
7-12	Scattered medium to small pothole wetlands on both sides of highway, mainly on west side
12-15	Scattered small pothole wetlands on both sides of highway

3.6 Hazardous Waste Areas

USEPA and MDEQ maintain several searchable databases on their websites to determine the presence of hazardous waste sites or hazardous materials generators in a particular area. For this environmental scan, several databases were queried for Sheridan and Roosevelt counties. Databases researched included:

- USEPA National Priorities List (NPL) sites in Montana (USEPA, 2006c)
- USEPA Comprehensive Environmental Response, Compensation, and Liability Index System (CERCLIS) (USEPA, 2006d)
- USEPA Resource Conservation and Recovery Act (RCRA) – database "RCRA Info" (USEPA, 2006d)
- USEPA Toxics Release Inventory (TRI) (USEPA, 2006e)
- National Response Center (NRC) database of oil, chemical, radiological, and biological discharges to the environment (NRC, 2006)
- MDEQ query service for abandoned mines, leaking underground storage tanks (LUST), petroleum tank releases, and remediation response sites (MDEQ, 2006b)

The NPL and CERCLIS database searches returned no sites within the study corridor.

Several abandoned mine sites are located in Roosevelt and Sheridan Counties. However, the database does not provide specific location information. According to MDT, most of these sites are open cut permits for aggregate. GIS-based mine sites are mapped in Figure 16.

The information recovered from the remaining databases is summarized by segment in the following sections. Observations were also made during field reconnaissance activities to note those areas that may be hazardous. GIS-based hazardous waste site locations, such as LUST sites, remediation response sites, and Petroleum Tank Release Compensation Board (petroleum board) sites, are presented in Figures 11 through 14.

Field reconnaissance for hazardous materials included observations from the roadway for aboveground tanks, businesses that may use hazardous substances, and obvious hazardous conditions. It should be noted that potential hazardous materials that were identified using searchable databases and windshield observations are not intended to substitute for hazardous materials due diligence prior. Environmental site assessments will have to be conducted prior to any land acquisition along the highway corridor.

3.6.1 US 2 – North Dakota State Line to Culbertson

3.6.1.1 RCRA Info Database Search

Facilities identified in the RCRA Info database within the US 2 – North Dakota State Line to Culbertson segment are summarized in Table 21.

Table 21. RCRA Sites in the US 2 - North Dakota State Line to Culbertson Segment

Handler Name	City	Description
Arcus Transportation, Inc.	Culbertson	No information provided
Miller Oil Company	Culbertson	CESQG and Used Oil Program
Montola Growers, Inc.	Culbertson	CESQG, Major Air Emissions Reporter, TRI Reporter
Operational Maintenance Shop	Culbertson	CESQG, Underground Storage Tank Program
Phillips Petro Co Culbertson Compres	Culbertson	Natural Gas Liquid Extraction
Triple M Culbertson	Culbertson	Used Oil Program
Notes: CESQG = Conditional Exempt Small Quantity Generator		

3.6.1.2 TRI Database Search

Facilities identified in the TRI database within the US 2 – North Dakota State Line to Culbertson segment are summarized in Table 22.

Table 22. TRI Sites in the US 2 - North Dakota State Line to Culbertson Segment

Facility Name	City	Description
Montola Growers Inc.	Culbertson	Manufacturer of Shortening, Table Oils, Margarine, and Other Edible Fats And Oils Air Emitter of N-Hexane

3.6.1.3 NRC Database Search

Facilities identified in the NRC database within the US 2 – North Dakota State Line to Culbertson segment are summarized in Table 23.

Table 23. NRC Sites in the US 2 - North Dakota State Line to Culbertson Segment

Date	Suspected Responsible Party	City	Description
01/21/1994	True Oil	Culbertson	Hydrogen sulfide released to air due to pipeline leak
06/03/1997	Transmontaigne Pipeline Co	Bainville	499 gallons of sodium nitrate solution released to soil due to equipment failure
01/05/2000	Eott Energy	US 2 near Williston (MT side)	Crude oil released to asphalt due to leaking tanker truck; area sanded to prevent migration
05/04/2003	Burlington Northern Santa Fe (BNSF) Railroad	Bainville	Leaking locomotive spilled 250-400 gallons of diesel between Minot, ND and Bainville, MT

3.6.1.4 LUST Database Search

Facilities identified in the LUST database within the US 2 – North Dakota State Line to Culbertson segment are summarized in Table 24. Figure 11 presents tank leaks in this segment.

Table 24. LUST Sites in the US 2 - North Dakota State Line to Culbertson Segment

Site Name	City	Active?	Confirmed Release Date	Resolved Date
Bjorge Oil & Trucking	Bainville	Yes	6/23/1999	Unresolved
Scot & Diane Panasuk	Bainville	No	9/6/1996	10/7/1996
Anderson Conoco Culbertson	Culbertson	No	11/19/1990	2/7/1991
Culbertson School Dist 17	Culbertson	No	7/12/1991	10/31/1991
Culbertson School Dist 17 Armory	Culbertson	No	6/23/1998	7/7/1999
Johnsens Cafe & Convenience Store	Culbertson	No	3/28/1996	4/29/1996
L & R Stop N Shop	Culbertson	No	6/25/1990	8/27/1990
Miller Oil Co Culbertson	Culbertson	Yes	2/18/1997	Unresolved
Missouri Breaks Truck Stop	Culbertson	No	3/5/1999	2/24/2004
Organizational Maint Shop 2	Culbertson	No	5/8/1989	5/22/1991
Roosevelt County	Culbertson	No	10/12/1994	4/7/1997
Svo Specialty Products	Culbertson	Yes	8/24/1996	Unresolved
Svo Specialty Products	Culbertson	No	5/16/1991	11/1/1996

3.6.1.5 Petroleum Tank Release Compensation Sites Database Search

The 1989 Montana Legislature created the Montana Petroleum Tank Release Compensation Board and the Montana Petroleum Tank Release Cleanup Fund. In 1991 the Legislature expanded coverage to certain petroleum storage tanks which were excluded in the 1989 legislation. The Fund was created to assist owners and/or operators of underground petroleum storage tanks in cleaning up petroleum contamination and compensating third party damages resulting from releases. Facilities identified in the Petroleum Tank Release Compensation Sites database within the US 2 – North Dakota State Line to Culbertson segment are summarized in Table 25. Figure 11 presents petroleum board sites for this segment.

Table 25. Tank Release Sites in the US 2 - North Dakota State Line to Culbertson Segment

Facility Name	City	No. of Releases
The Welcome Stop	Bainville	1
SVO Specialty Products	Culbertson	1
L & R Stop & Shop	Culbertson	1

3.6.1.6 Remediation Response Sites Database Search

Facilities identified in the Remediation Response Sites database within the US 2 – North Dakota State Line to Culbertson segment are summarized in Table 26. Figure 11 presents remediation response sites for this segment.

Table 26. Remediation Sites in the US 2 - North Dakota State Line to Culbertson Segment

Site Name	City	Operation	Description
Burlington Northern Derailment Site Bainville	Bainville	Derailment occurred 09/28/80	Former train derailment/spill site

3.6.1.7 Field Observations

Observations made along the US 2 – North Dakota State Line to Culbertson segment regarding potential hazardous materials areas are summarized in Table 27.

Table 27. Hazardous Materials Observations in the US 2 - North Dakota State Line to Culbertson Segment

Approximate Milepost	Description
661-660	Scattered tank sites, a tank farm, and oil pumping and storage site (contents of tanks unknown, but assumed to be crude oil)
659	Observed "Welcome Stop" site, found in petroleum tank release compensation site database searches
657.5	Observed aboveground tanks on south side of road
653.5	Tank farm on south side of road, surrounded by mapped wetlands (hayed) (contents of tank unknown, but assumed to be crude oil)
646	Traction sand stockpile area
645.5	Montola Growers Inc., Custom Built Feeds, found in RCRA and TRI databases
644.5	Sinclair and Exxon (Oelker's) on SW and SE corners of intersection

3.6.2 MT 16 – Culbertson to Medicine Lake

3.6.2.1 RCRA Info Database Search

Facilities identified in the RCRA Info database within the MT 16 – Culbertson to Medicine Lake segment are summarized in Table 28.

Table 28. RCRA Sites in the MT 16 – Culbertson to Medicine Lake Segment

Handler Name	City	Description
Koch-Krogedahl Station	Froid	Natural Gas Liquid Extraction, Minor Air Emissions Reporter
Medicine Lake Station	Medicine Lake	Natural Gas Liquid Extraction
Herman Oil Inc	Medicine Lake	CESQG
Notes: CESQG = Conditional Exempt Small Quantity Generator		

3.6.2.2 TRI Database Search

No facilities were identified in the TRI database within the MT 16 – Culbertson to Medicine Lake segment.

3.6.2.3 NRC Database Search

Facilities identified in the NRC database within the MT 16 – Culbertson to Medicine Lake segment are summarized in Table 29.

Table 29. NRC Sites in the MT 16 – Culbertson to Medicine Lake Segment

Date	Suspected Responsible Party	City	Description
01/04/1996	True Oil	Culbertson	Hydrogen sulfide released to air due to equipment failure

3.6.2.4 LUST Database Search

Facilities identified in the LUST database within the MT 16 – Culbertson to Medicine Lake segment are summarized in Table 30. Figures 12 and 13 present tank leaks for this segment.

Table 30. LUST Sites in the MT 16 – Culbertson to Medicine Lake Segment

Site Name	City	Active?	Confirmed Release Date	Resolved Date
USDA Ars Ag Research Service	Culbertson	No	8/2/1991	10/4/1991
Davidson Oil Co	Froid	No	7/12/1991	7/7/1992
Farmers Union Oil Co Froid	Froid	No	2/14/1991	1/28/1997
Froid School Teacherage	Froid	No	11/4/1996	9/30/1997
Mark B & Mary Linda Rudolph	Froid	No	10/4/1993	11/9/1993
Roosevelt County	Froid	No	10/12/1994	12/4/1995
Herman Oil Inc Medicine Lake	Medicine Lake	Yes	10/14/1997	unresolved
Medicine Lake NWR 4602269	Medicine Lake	No	8/15/1994	2/23/1998

3.6.2.5 Petroleum Tank Release Compensation Sites Database Search

No facilities were identified in the Petroleum Tank Release Compensation Sites database within the MT 16 – Culbertson to Medicine Lake segment (Figures 12 and 13).

3.6.2.6 Remediation Response Sites Database Search

Facilities identified in the Remediation Response Sites database within the MT 16 – Culbertson to Medicine Lake segment are summarized in Table 31. Remediation response sites in this segment are presented in Figures 12 and 13.

Table 31. Remediation Sites in the MT 16 – Culbertson to Medicine Lake Segment

Site Name	City	Operation	Description
Koch Hydrocarbon Co Krogadahl Station	Froid	Oil and gas production	LNAPL in 176-ft well.
Medicine Lake NWR	Medicine Lake		No information listed in database

3.6.2.7 Field Observations

Observations made along the MT 16 – Culbertson to Medicine Lake segment regarding potential hazardous materials areas are summarized in Table 32.

Table 32. Hazardous Materials Observations in the MT 16 – Culbertson to Medicine Lake Segment

Approximate Milepost	Description
82	Gas pipeline running northwest/southeast
82	MDT maintenance facility with snow blades, etc. with ASTs, ½ mile east of highway
81	Large aboveground storage tank (AST) observed approx. 0.4 miles west of highway
78	Junk/debris, old structures observed on west side of highway
76	Traction sand stockpile observed on west side of highway
76	Lagoons observed on west side of highway
76.25	Lodahl Farm and Auto Repair in Froid
69.5	Elevated AST's (assumed to be heating oil) observed on west side of highway
64.5	Automotive machine shop observed on west side of highway
64	Herman Oil site observed; listed in LUST database
64	Electric Co-op observed
64	Junkyard observed on east side of highway

3.6.3 MT 16 – Medicine Lake to Plentywood

3.6.3.1 RCRA Info Database Search

Facilities identified in the RCRA Info database within the MT 16 – Medicine Lake to Plentywood segment are summarized in Table 33.

Table 33. RCRA Sites in the MT 16 – Medicine Lake to Plentywood Segment

Handler Name	City	Description
Farmers Union Oil Company	Plentywood	CESQG, Underground Storage Tank Program
Steward and Stevenson	Plentywood	CESQG
Sunmark Expl Co Anderson 1406456	N. of Medicine Lake (MP 61)	No information provided
Triple M	Plentywood	CESQG, Used Oil Program, Underground Storage Tank Program
Notes: CESQG = Conditional Exempt Small Quantity Generator		

3.6.3.2 TRI Database Search

No facilities were identified in the TRI database within the MT 16 – Medicine Lake to Plentywood segment.

3.6.3.3 NRC Database Search

Facilities identified in the NRC database within the MT 16 – Medicine Lake to Plentywood segment are summarized in Table 34.

Table 34. NRC Sites in the MT 16 – Medicine Lake to Plentywood Segment

Date	Suspected Responsible Party	City	Description
09/23/1994	Power Fuels	MT 16, 3 miles north of Medicine Lake	250 barrels of crude oil released to drainage channel to Big Muddy Creek due to tanker spill; berm was built to contain spill
06/25/1998	Portal Pipeline	Reserve	100 barrels of crude oil released due to overfilling of AST; all material contained in tank dike

3.6.3.4 LUST Database Search

Facilities identified in the LUST database within the MT 16 – Medicine Lake to Plentywood segment are summarized in Table 35. Tank leaks for this segment are presented in Figures 13 and 14.

Table 35. LUST Sites in the MT 16 – Medicine Lake to Plentywood Segment

Site Name	City	Active?	Confirmed Release Date	Resolved Date
J & M Service	Reserve	No	6/28/1991	11/17/1992

Site Name	City	Active?	Confirmed Release Date	Resolved Date
Alfred K Tange	Plentywood	No	8/12/1992	8/19/1992
Alvin Newmnam	Plentywood	No	11/5/1993	2/8/1994
Auto Tech Services	Plentywood	No	9/10/2000	12/27/2000
Ben Franklin Store Mirps Inc	Plentywood	No	10/1/1996	10/8/1996
Billie C Hibbert	Plentywood	No	2/27/1992	4/23/1992
Charles Fay Chandler Sr	Plentywood	No	7/25/1993	9/10/1996
David G & Jane A Fulkerson	Plentywood	No	4/24/1990	5/14/1990
Donald Bolke Residence	Plentywood	Yes	6/3/1999	Not resolved
Dorothy Brockmier	Plentywood	No	12/8/1992	2/18/1993
Ernest Berland	Plentywood	No	7/11/1994	11/27/2000
Farmers Union Oil Co Plentywood	Plentywood	No	8/22/1996	9/30/1996
Farmers Union Oil Co Plentywood	Plentywood	No	1/23/1997	8/14/1997
Former Peterson Hardware	Plentywood	No	6/18/1997	7/22/1997
Gordon Overby	Plentywood	No	9/28/1993	10/29/1993
Harvey Carpenter	Plentywood	No	9/17/1990	10/24/1990
James Kisler	Plentywood	No	12/5/1991	1/16/1992
Kenneth D Collins Agency	Plentywood	No	11/8/1993	11/30/1993
Mary Johnson	Plentywood	No	9/28/1992	10/16/1992
Merlin Andersen	Plentywood	No	12/30/1991	5/8/1992
Miller Oil Co E Railroad Ave	Plentywood	Yes	11/4/2003	Not resolved
Montana Pioneer Manor Inc	Plentywood	No	5/9/1996	10/14/1998
Oddlaug Williams	Plentywood	No	12/19/1991	7/7/1992
Peavey Co Plentywood	Plentywood	No	11/27/1990	5/3/1991
Petersons Ready To Wear	Plentywood	No	8/28/1990	9/19/1990
Plentywood School Dist 20	Plentywood	No	9/14/1989	11/30/1990

Site Name	City	Active?	Confirmed Release Date	Resolved Date
Plw Enterprises	Plentywood	No	8/24/1993	10/6/1995
Rice Oil Co	Plentywood	No	12/23/1993	2/24/1994
Shackelford	Plentywood	No	10/11/1991	7/7/1992
Triple M Oil	Plentywood	No	7/28/2000	10/5/2000
Western Implement	Plentywood	No	10/16/1991	8/21/1996
Williston Scobey Transfer Plentywood	Plentywood	No	9/26/1990	8/31/1992

3.6.3.5 Petroleum Tank Release Compensation Sites Database Search

Facilities identified in the Petroleum Tank Release Compensation Sites database within the MT 16 – Medicine Lake to Plentywood segment are summarized in Table 36. Petroleum board sites in this segment are presented in Figures 13 and 14.

Table 36. Tank Release Sites in the MT 16 – Medicine Lake to Plentywood Segment

Facility Name	City	No. of Releases
PLW Enterprises	Plentywood	1
Auto Tech Services	Plentywood	1
Williston Scobey Transfer Plentywood	Plentywood	1
Triple M Oil	Plentywood	1
Shackelford	Plentywood	1
Peavey Co.	Plentywood	1

3.6.3.6 Remediation Response Sites Database Search

Facilities identified in the Remediation Response Sites database within the MT 16 – Medicine Lake to Plentywood segment are summarized in Table 37. Remediation response sites for this segment are presented in Figures 13 and 14.

Table 37. Remediation Sites in the MT 16 – Medicine Lake to Plentywood Segment

Site Name	City	Operation	Description
Bolke Residence	Plentywood		Private residence. non-regulated heating oil tank spill.

3.6.3.7 Field Observations

Observations made along the MT 16 – Medicine Lake to Plentywood segment regarding potential hazardous materials areas are summarized in Table 38.

Table 38. Hazardous Materials Observations in the MT 16 – Medicine Lake to Plentywood Segment

Approximate Milepost	Description
62	Sludge pond and 10 ASTs observed on west side of highway
59	Oil ASTs observed on west side of highway (assumed to be crude oil)
57	Tank farm observed on east side of highway (contents unknown but assumed to be crude oil)
50	Auto body shop observed in Antelope on east side of highway
44.5	Columbia Grain - grain elevator observed on west side of highway
42.1	Tank leak and petroleum board site mapped in Plentywood at corner of Broadmore St. not observed
42	Miller Oil Company (gas and oil) observed in Plentywood at Monroe St.
41.9	Kum and Go gas station observed in Plentywood at Adams St.
41.7	Curtiss Farm and Auto (CarQuest) observed in Plentywood at Jackson St.
41.7	Prairie Automotive observed in Plentywood at 122 1st Ave (MT 16)
41.7	Sheridan Sheet Metal Heating observed in Plentywood at 116 1st Ave
41.6	Supervalu observed in Plentywood at Main
41.6	Northern Wheel Alignment Service observed in Plentywood (S. Jefferson)
41.6	Old Exxon observed in Plentywood at Jefferson
41.3	MDT maintenance facility observed at southeast corner of MT 16 and MT 5

3.6.4 MT 16 – Plentywood to the Canadian Border

3.6.4.1 RCRA Info Database Search

No facilities were identified in the RCRA Info database within the MT 16 – Plentywood to the Canadian Border segment.

3.6.4.2 TRI Database Search

No facilities were identified in the TRI database within the MT 16 – Plentywood to the Canadian Border segment.

3.6.4.3 NRC Database Search

No facilities were identified in the NRC database within the MT 16 – Plentywood to the Canadian Border segment.

3.6.4.4 LUST Database Search

Facilities identified in the LUST database within the MT 16 – Plentywood to the Canadian Border segment are summarized in Table 39. Tank leaks in this segment are presented in Figure 14.

Table 39. LUST Sites in the MT 16 –Plentywood to the Canadian Border Segment

Site Name	City	Active?	Confirmed Release Date	Resolved Date
Border Port of Entry	Raymond	No	10/30/1996	1/16/1997

3.6.4.5 Petroleum Tank Release Compensation Sites Database Search

No facilities were identified in the Petroleum Tank Release Compensation Sites database within the MT 16 – Plentywood to the Canadian Border segment (Figure 14).

3.6.4.6 Remediation Response Sites Database Search

No facilities were identified in the Remediation Response Sites database within the MT 16 – Plentywood to the Canadian Border segment (Figure 14).

3.6.4.7 Field Observations

Observations made along the MT 16 – Plentywood to the Canadian Border segment regarding potential hazardous materials areas are summarized in Table 40.

Table 40. Hazardous Materials Observations in the MT 16 – Plentywood to the Canadian Border Segment

Approximate Milepost	Description
0.0	Cooper Tire observed in Plentywood (northeast corner of MT 16 and MT 5)
0.0	Welding shop observed in Plentywood (northwest corner of MT 16 and MT 5)
0.1	CanAm Convenience Store and Gas observed in Plentywood (west side of 16)
0.2	Homeland Security building observed in Plentywood on west side of highway

4 Biological Resources

Available information was reviewed to identify potential wildlife resources within the corridor study area, including the federal lists of threatened and endangered species and state lists of species of concern. Because biological resources tend to encompass more regional areas, and the study corridor exhibits many of the same types of habitat throughout with a few exceptions, this section is organized by types of biological resources rather than by study corridor segments. These discussions are then broken down by what is expected to occur in each of Roosevelt and Sheridan counties, as species information is typically grouped by county. The study corridor segments are summarized by county in Table 41.

Table 41. Study Corridor Segments by County

County	Segments Located within County
Roosevelt	US 2 – North Dakota to Culbertson (ALL) MT 16 – Culbertson to Medicine Lake (MP 88.5-72)
Sheridan	MT 16 – Culbertson to Medicine Lake (MP 72-64) MT 16 – Medicine Lake to Plentywood (ALL) MT 16 – Plentywood to Canadian Border (ALL)

Field reconnaissance for biological resources included observations from the roadway for signage indicating wildlife crossings, constructed habitat such as bird boxes, and direct wildlife observations. It should be noted that potential biological resources that were identified using available MFWP data and

windshield observations are not intended to substitute for an extensive biological evaluation. Wetland Consultation with USFWS will have to be conducted prior to any construction along the highway corridor and will likely result in the preparation of a biological assessment.

4.1 Fish and Wildlife

The study corridor lies within plains grassland habitat. Antelope and mule deer inhabit the open and rougher terrain. White-tailed deer are found along rivers and streams. The productive Prairie Pothole region produces thousands of ducks and geese. Pheasants are found in agricultural areas, and native sharp-tailed and sage grouse are plentiful in grassy and prairie habitat. The Missouri River is host to a wide variety of fish, including brown trout, whitefish, northern pike, rainbow trout, sturgeon, and yellow perch.

According to available GIS data, the entire study corridor falls within white tail deer range, antelope range, and Hungarian partridge range. Various portions of the study corridor fall within pheasant habitat. Sharp-tail grouse ranges through most of the corridor, except for areas just north and east of Culbertson. Turkey range is near, but not inside of the study corridor, being mainly associated with the Missouri River south of Culbertson. Signs of wildlife observed in the field are summarized in Table 42.

Table 42. Signs of Wildlife in the Study Corridor Observed in the Field

Approximate Milepost	Description
MT-16, MP 84	Deer crossing sign, southbound
MT-16, MP 74	Duck boxes observed in mapped wetland areas on east side of highway
MT-16, MP 67	Deer crossing sign, northbound

4.1.1 Threatened and Endangered Species

The federal list of endangered and threatened species is maintained by the USFWS. Species on this list receive protection under the Endangered Species Act (ESA). An 'endangered' species is one that is in danger of extinction throughout all or a significant portion of its range. A 'threatened' species is one that is likely to become endangered in the foreseeable future. The USFWS also maintains a list of species that are candidates or proposed for possible addition to the federal list.

The endangered, threatened, proposed, and candidate species list for Montana counties was downloaded from the USFWS website on August 29, 2006 (Appendix D). This list generally identifies the counties where one would reasonably expect the species to occur, not necessarily every county where the species is listed.

4.1.1.1 Roosevelt County

Federally listed endangered, threatened, proposed, and candidate species for Roosevelt County are summarized in Table 43.

Table 43. Federally Listed ESA Species on Roosevelt County

Scientific Name	Common Name	Status
Scaphirhynchus albus	Pallid Sturgeon	Listed Endangered
Haliaeetus leucocephalus	Bald Eagle	Listed Threatened
Charadrius melodus	Piping Plover	Listed Threatened Critical Habitat Designated

Scientific Name	Common Name	Status
Sterna antillarum athalassos	Interior Least Tern	Listed Endangered
Grus Americana	Whooping Crane	Listed Endangered

The pallid sturgeon is the larger of the two species of sturgeon found east of the Continental Divide. In Montana, pallid sturgeon use large turbid streams including the Missouri and Yellowstone rivers. One of the most obvious detrimental changes in the pallid sturgeon environment was the damming of the Missouri River and several other important tributaries. While the Missouri River is generally over a mile from the study corridor, upstream and nearby land use practices may degrade water quality. (MFWP, 2006b)

The bald eagle is second in size of North American birds of prey only to the California Condor. The majority of birds nesting in Montana are found in the western third of the state; although breeding pairs may be found along many of the major rivers and lakes in the central portion of the state and along the Yellowstone and Missouri Rivers to the eastern prairie lands. East of the Continental Divide, the presence of bald eagles may be somewhat more seasonally dependent than in the western part of the state, for migrants from more northerly climes travel through Montana to reach their wintering grounds further south. Important year-round habitat includes wetlands, major water bodies, spring spawning streams, ungulate winter ranges and open water areas. (MFWP, 2006b) Occurrence of the bald eagle in the study corridor is possible, particularly during periods of seasonal migration in the spring and fall.

Piping Plovers are limited to the open shorelines of freshwater or alkaline lakes, reservoirs, rivers, or wetlands. The piping plover is generally a species of northern and northeastern Montana. This species is known to breed in Medicine Lake NWR, Sheridan County, and the Missouri River below Fort Peck Dam. The Piping Plover usually arrives in Montana in early May and leaves the state by late August. Most of the observations reported in the state are for breeding individuals, or for activity that suggests breeding. (MFWP, 2006b) Its seasonal presence on the Missouri River may indicate that construction windows could be imposed upon the US 2 – North Dakota State Line to Culbertson corridor segment.

Piping Plovers primarily select unvegetated sand or pebble beaches on shorelines or islands in freshwater and saline wetlands. Vegetation, if present at all, consists of sparse, scattered clumps. Open shorelines and sandbars of rivers and large reservoirs in the eastern and north-central portions of the state provide prime breeding habitat. The alkali wetlands and lakes found in the northeastern corner of the state generally contain wide, unvegetated, gravelly, salt-encrusted beaches. Four specific geographic areas, recognized as providing critically important habitat and identified as essential for the conservation of the piping plover, have been designated as "Critical Habitat Units" in Montana. The designation of critical habitat may require federal agencies to develop special management actions affecting these sites. Unit 2 is identified as riverine habitat and includes the Missouri River just south of Wolf Point to the state line, encompassing habitat provided by the sparsely vegetated sandbars, and sandy or gravelly beaches along this stretch of the river. (MFWP, 2006b)

The interior least tern has similar habitat characteristics to the piping plover. The species breeds along the lower portions of the Missouri River below Fort Peck Dam, on the beaches of Fort Peck Reservoir, and on the Yellowstone River below Glendive. Most of the observations in the state have been recorded for breeding pairs, with few reported sightings of transient individuals. Spring arrival of the species occurs in mid-May, with departure in the fall generally occurring by mid-August. (MFWP, 2006b) Its seasonal presence on the Missouri River may indicate that construction windows could be imposed upon the US 2 – North Dakota to Culbertson corridor segment. Interior Least Terns nest on unvegetated sand-pebble beaches and islands of large reservoirs and rivers in northeastern and southeastern Montana, specifically the Yellowstone and Missouri river systems. These wide, open river channels, and lake and pothole shorelines provide the preferred characteristics for nesting terns. (MFWP, 2006b)

The whooping crane is the tallest bird of North America, reaching nearly five feet in height. Transient individual whooping cranes have been reported throughout the eastern portions of the state, with most of those records for Sheridan (Medicine Lake NWR) and Roosevelt counties. For the past 20 years, observations have been restricted to the northeast corner of the state. The birds observed in the eastern corner of Montana are occasional migrants traveling through from the Arkansas population on journey to the breeding grounds in Alberta and the Northwest Territories. The whooping crane is known to fly through Montana during both spring and fall migration. The whooping crane has been observed in the marsh habitat present at Medicine Lake NWR. Observations of individual birds in other areas of the state include grain and stubble fields as well as wet meadows, wet prairie habitat, and freshwater marshes that are usually shallow and broad with safe roosting sites and nearby foraging opportunities. The whooping crane is not known to breed in the state. (MFWP, 2006b) The whooping crane could occur in the study corridor in Roosevelt County in grain and stubble fields and prairie wetland areas.

4.1.1.2 Sheridan County

Federally listed endangered, threatened, proposed, and candidate species for Sheridan County are summarized in Table 44.

Table 44. Federally Listed ESA Species in Sheridan County

Scientific Name	Common Name	Status
Haliaeetus leucocephalus	Bald Eagle	Listed Threatened
Charadrius melodus	Piping Plover	Listed Threatened Critical Habitat Designated
Grus Americana	Whooping Crane	Listed Endangered

See Section 4.1.1.1 for descriptions of these species. Occurrence of the bald eagle in the study corridor in Sheridan County is unlikely but possible. According to a brochure obtained from the Medicine Lake NWR, the refuge is located in the migrational corridor for bald eagles and that this rare species make occasional visits in the spring and fall (USFWS, 1992).

According to a Medicine Lake NWR brochure dated in 1992, the refuge supports an active breeding population of endangered piping plovers. Up to 30 pairs of the bird had nested on the refuge in years leading up to publishing of the brochure. (USFWS, 1992) The first unit of designated critical habitat for the piping plover, Unit 1, contains alkali lake and wetland habitat found in Sheridan County. (MFWP, 2006b) Therefore, any wetland habitat in the study corridor, in Sheridan County could be considered critical habitat for piping plover.

The whooping crane has been observed in the marsh habitat present at Medicine Lake NWR. Observations of individual birds in other areas of the state include grain and stubble fields as well as wet meadows, wet prairie habitat, and freshwater marshes that are usually shallow and broad with safe roosting sites and nearby foraging opportunities. The whooping crane is not known to breed in the state. (MFWP, 2006b) According to a brochure obtained from the Medicine Lake NWR, the refuge is located in the migrational corridor for whooping cranes and that this rare species make occasional visits in the spring and fall (USFWS, 1992).

4.1.2 Species of Concern

Montana Species of Concern are native animals breeding in the state that are considered to be "at risk" due to declining population trends, threats to their habitats, and/or restricted distribution. Designation of a species as a Montana Animal Species of Concern is not a statutory or regulatory classification. Instead, these designations provide a basis for resource managers and decision-makers to direct limited resources to priority data collection needs and address conservation needs proactively. Each species is

assigned a state rank that ranges from S1 (greatest concern) to S5 (least concern). Other state ranks include SU (unrankable due to insufficient information), SH (historically occurred), and SX (believed to be extinct). State ranks may be followed by modifiers, such as B (breeding) or N (nonbreeding).

The potential presence of each Species of Concern within the study corridor was determined by range maps and/or descriptions provided for each species. Table 45 provides a summary of Species of Concern that are thought to range in northeastern Montana. Figure 17 presents the number of species of concern present within each square mile in and near the study corridor.

Table 45. Animal Species of Concern Ranging in Northeastern Montana

Species Common Name	State Rank	Typical Habitat
Amphibians		
Great Plains Toad	S2	wetlands, floodplain pools
Northern Leopard Frog	S3	wetlands, floodplain pools
Plains Spadefoot	S3	wetlands, floodplain pools
Birds		
Alder Flycatcher	S1B	wetlands/shrublands
American White Pelican	S3B	lakes
Baird's Sparrow	S2B	grasslands
Bald Eagle	S3	riparian forest
Black Tern	S3B	wetlands
Black-and-white Warbler	S2S3B	deciduous forests
Black-crowned Night-heron	S3B	wetland/lake with emergent vegetation
Bobolink	S2B	moist grassland
Burrowing Owl	S2B	grasslands
Caspian Tern	S2B	large rivers and lakes
Chestnut-collared Longspur	S3B	grasslands
Common Loon	S2B	mountain lakes with emergent vegetation
Common Tern	S3B	large rivers and lakes
Eastern Bluebird	S2B	prairie woodlands
Ferruginous Hawk	S2B	sagebrush/grasslands
Forster's Tern	S2B	wetlands
Franklin's Gull	S3B	wetland/lake with emergent vegetation
Grasshopper Sparrow	S3B	grasslands
Greater Sage-grouse	S3	sagebrush
Interior Least Tern	S1B	large prairie rivers
Lark Bunting	S3B	sagebrush/grasslands
LeConte's Sparrow	S1S2B	prairie wetlands
Loggerhead Shrike	S3B	shrublands
Long-billed Curlew	S2B	grasslands
McCown's Longspur	S2B	grasslands
Northern Goshawk	S3	mixed conifer forest
Olive-side Flycatcher	S3B	early seral forest/shrub patches
Peregrine Falcon	S2B	cliffs
Piping Plover	S2B	prairie lake and river shoreline
Red-headed Woodpecker	S3B	riparian forest
Sedge Wren	S1B	prairie wetlands
Sprague's Pipit	S2B	grasslands
Swainson's Hawk	S3B	sage/grassland with woody vegetation
White-faced Ibis	S1B	wetland/lake with emergent vegetation
Yellow Rail	S1B	wetlands

Species Common Name	State Rank	Typical Habitat
Fish		
Blue Sucker	S2S3	large prairie rivers
Paddlefish	S1S2	large prairie rivers
Pallid Sturgeon	S1	large prairie rivers
Pearl Dace	S2	small prairie streams
Sauger	S2	large prairie rivers
Sicklefin Chub	S1	large prairie rivers
Sturgeon Chub	S2	large prairie rivers
Mammals		
Arctic Shrew	S1S3	wetlands
Black-tailed Prairie Dog	S3	grasslands
Preble's Shrew	S3	sagebrush/grasslands
Townsend's Big-eared Bat	S2	caves in forested habitats
Reptiles		
Greater Short-horned Lizard	S3	sandy/gravelly soils
Sagebrush Lizard	S3	rock outcrops
Smooth Green Snake	S2	wetlands
Western Hognose Snake	S2	floodplain friable soils

4.1.3 National Wildlife Refuges

The study corridor passes through the Medicine Lake National NWR. This refuge lies within the highly productive prairie pothole region that extends from southern Canada through northeast Montana, the Dakotas, and western Minnesota. The region contains many thousands of small wetlands that produce over 50 percent of the waterfowl originating in the contiguous United States. Medicine Lake NWR lies in the mixed grass and short grass prairie transition zone. Marshes, shelterbelts, croplands, grasslands, and large water bodies provide both migration and nesting habitat for a vast array of wildlife. Improvements to the roadway that would widen or realign it through the Medicine Lake NWR would likely affect adjacent habitats. Pursuant to section 4(f) of the U.S. Department of Transportation Act of 1966, the U.S. Fish and Wildlife Service notes that coordination with Refuge staff would be required relative to these concerns and others that may become apparent if a project is proposed for this stretch of highway.

The refuge was established in 1935 and today consists of two units comprising 31,457 acres. The north unit contains the 8,700-acre Medicine Lake as wells as eight other small lakes. The Homestead Unit consists of the 1,280-acre Homestead Lake and adjacent uplands. The 11,360-acre Medicine Lake Wilderness Area was established by Congress in 1976. this area includes the main water body of the lake and the islands within. Also included is the 2,320-acre Sandhills Unit with its unique rolling hills, native grass, cactus, and clumps of chokecherry, buffalo berry, and buck brush.

Restoration of breeding population of Great Basin Canada geese was initiated in 1938 and supplemented with releases of additional birds up to 1957. By 1992, the resident refuge population of Canada geese was in excess of 1,000 birds with annual production of about 900 goslings.

Marsh and water areas of the refuge attract up to a quarter-million waterfowl during the spring and fall migration. Some of these species remain to nest on the refuge and produce up to 30,000 ducklings each year.

The refuge has one of the largest white pelican rookeries left in the United States. Over 2,000 pelicans are generally produced each year. The refuge islands provide secure nesting sites for other colonial nesters, including double-crested cormorants, California and ring-bills gulls, and great blue herons. Grebes, and many other marsh and shore birds nest in the vegetation and on the shoreline of the lakes.

Thousands of sandhill cranes arrive in the vicinity of the refuge for a short stop on their way south each October. The refuge is located in the migrational corridor of the endangered whooping crane, bald eagle, and peregrine falcon. The refuge also supports an active breeding population of endangered piping plovers.

Ring-necked pheasants are commonly seen along the refuge tour route. Pheasants find the heavy grass, alfalfa, and grain mixture (which is seeded for waterfowl nesting cover) to their liking. These stands of seeded grass also attract one of the largest white-tailed deer populations in northeast Montana.

The prairie grasslands are habitat for many prairie birds that are Montana Species of Concern, including burrowing owls, lark bunting, Baird's and LeConte's sparrows, chestnut-collared and McCown's longspurs, and occasionally the Sprague's pipit. Prairie grasslands are also home to short-eared owls and sharp-tailed grouse.

Neighboring farmers grow grain crops on designated refuge acres each year. The refuge share, approximately 25 percent, is left standing to provide food sources for many species of wildlife. (USFWS, 1992)

4.1.4 Block Management Areas

There are several BMAs located throughout the study corridor. Block Management is a cooperative effort between MFWP, private landowners, and public land management agencies to help landowners manage hunting activities and provide free public hunting access to private and isolated public lands. BMA cooperators receive benefits for providing free public hunting under certain terms. Each BMA is unique, and they range in size from 50 to more than 100,000 acres. The program is funded by portions of various license fees.

4.2 Vegetation

4.2.1 Threatened and Endangered Species

The federal list of endangered and threatened species is maintained by the USFWS. Species on this list receive protection under the ESA. The endangered, threatened, proposed, and candidate species list for Montana counties was downloaded from the USFWS website on August 29, 2006 (Appendix D). This list generally identifies the counties where one would reasonably expect the species to occur, not necessarily every county where the species is listed. No vegetative species were listed for Roosevelt or Sheridan counties.

4.2.2 Species of Concern

The Montana Natural Heritage Program serves as the state's clearinghouse and principle information source for Species of Concern – plants and animals that are at risk or potentially at risk in Montana. The Plant Species of Concern report, dated June 2006, identifies 358 vascular plant Species of Concern based on information gathered from field inventories, publications, reports, herbarium specimens, and the knowledge of Montana botanists. These plants are listed by scientific names in a table that specifies county distributions, among other information. Those plants ranging in Roosevelt and Sheridan counties are summarized in the following sections. None of the plant Species of Concern in Roosevelt and Sheridan counties are considered endemic (not occurring elsewhere). Figure 17 presents the number of species of concern present within each square mile in and near the study corridor.

4.2.2.1 Roosevelt County

The Plant Species of Concern listed for Roosevelt County are summarized in Table 46.

Table 46. Plant Species of Concern in Roosevelt County

Plant Species Common Name	State Rank
Bractless Mentzelia	S1
Poison Suckleya	S1
Nannyberry	S1
Green Muhly (Species of Potential Concern)	S3

4.2.2.2 Sheridan County

The Plant Species of Concern listed for Sheridan County are summarized in Table 47.

Table 47. Plant Species of Concern in Sheridan County

Plant Species Common Name	State Rank
Ovalleaf Milkweed	S1
Chaffweed	S2
Smooth Goosefoot	S1
Fendler Cat's-eye	S2
Silky Prairie Clover	S1
Pale-spiked Lobelia	S1
Plains Phlox	S2
Mealy Primrose	S2
Many-headed Sedge	S1
Schweinitz' Flatsedge	S2
Slender Bulrush	S1
Northern Blue-eyed Grass	S1

4.2.3 Noxious Weeds

Noxious weeds degrade habitat, choke streams, crowd native plants, create fire hazards, poison and injure livestock and humans, and foul recreation sites. Areas with a history of disturbance are at particular risk of weed encroachment. There are 27 noxious weeds in Montana, as designated by the Montana Statewide Noxious Weed List. Of those 27, seven occur in Roosevelt and Sheridan counties. Sheridan County has designated Showy Milkweed and Baby's Breath as noxious in addition to the state-designated weeds. Additionally, two federally listed noxious weeds, Dodder and Broomrape, are reported to occur within the two-county area. Table 48 summarizes the noxious weed species known or reported to occur in the study corridor.

Table 48. Noxious Weed Species Known or Reported to Occur in the Study Corridor

Species	Status or Designation	County of Occurrence
Dodder *(Cuscata)*	Federal Designated Noxious Weed	Roosevelt
Broomrape *(Orobanche)*	Federal Designated Noxious Weed	Sheridan
Canada Thistle *(Cirsium arvense)*	State Designated Noxious Weed	Roosevelt, Sheridan
Field Bindweed *(Convolvulus arvensis)*	State Designated Noxious Weed	Roosevelt, Sheridan
Whitetop *(Cardaria draba)*	State Designated Noxious Weed	Sheridan
Leafy Spurge *(Euphorbia esula)*	State Designated Noxious Weed	Roosevelt, Sheridan
Dalmatian Toadflax *(Linaria dalmatica)*	State Designated Noxious Weed	Roosevelt, Sheridan
Common Tansy *(Tanacetum vulgare)*	State Designated Noxious Weed	Sheridan
Showy Milkweed *(Asclepias speciosa)*	County Designated Noxious Weed	Sheridan
Baby's Breath *(Gypsophila paniculata)*	County Designated Noxious Weed	Sheridan

Areas of brush clearing concern and Herbicide Free Areas are expected to occur within the Study Area. The MDT Maintenance Manual provides vegetation management guidance for brush clearing concerns along state roadways. The manual provides information on timing of maintenance and environmental best management practices for brush and tree removal. Weed districts in the state may develop an Herbicide Free Area Agreement for landowners who request that herbicides not be applied to roadside rights-of-way adjoining their property (MDT, 2006). Construction activities in the study corridor should also abide by the MDT "Roadside Vegetation Management Plan – Integrated Weed Management Component", dated April 2006. County Weed Control Supervisors and MDT Wolf Point Division vegetation management personnel should be contacted prior to any construction activities regarding specific locations.

5 Cultural Resources

The cultural resource review consisted of a review of the Montana NRHP for Roosevelt and Sheridan counties, receipt of comments from an MDT archaeologist regarding cultural resources (Appendix C), and field reconnaissance to provide a preliminary overview of potential resources within the study corridor. Figure 15 presents cultural resources in and near the study corridor.

Steve Platt, archaeologist for MDT, wrote a letter regarding cultural resources for the TRED study on July 12, 2006. This letter stated that "...MDT can expect there to be dozens of archaeological sites within the proposed corridor, many of them significant to our understanding of local and regional prehistory...In addition to archaeological resources we can expect to find historic homesteads and ranches within the proposed corridor, as well as historic buildings within the towns of Plentywood, Antelope, Medicine Lake, and Culbertson.

"Assinibone and Sioux members of the Fort Peck Indian Reservation will undoubtedly have an interest in some or all of the prehistoric sites I have discussed above. They likely continue to pursue a variety of traditional uses (plant gathering, hunting, religious practice, etc...) within the corridor as well. I am also certain that the Fort Peck Tribes will have a vested interest in Montana 16 and Highway 2 expansion from an economic perspective.

"Should MDT decide to pursue expansion of the Montana 16 and US 2 facilities MDT will need to proceed with a full blown cultural resource inventory, archaeological testing, and requisite consultation with the Fork Peck Tribes."

Information provided in the letter regarding cultural resources particular to each corridor segment are summarized in the following sections. Coordination will be required with the Fort Peck Indian Reservation during project development to determine the presence of traditional cultural properties and/or traditional hunting grounds.

5.1 US 2 – North Dakota State Line to Culbertson

One site was found listed on the NRHP that would fall within the US 2 – North Dakota State Line to Culbertson segment, and is summarized in Table 49.

Table 49. NRHP Sites in US 2 - North Dakota State Line to Culbertson Segment

Name	City	Listed Date	NR Reference No.
Hale's Filling Station and Grocery	Bainville	8/16/1994	94000864

Field observations made regarding cultural resources within this segment are summarized in Table 50.

Table 50. Cultural Resources Observed in US 2 - North Dakota State Line to Culbertson Segment

Approximate Milepost	Description
653.5	Older rural residence observed on north side of road
661	Historic marker about Fort Union observed on north side of road
663	Older rural residence observed on north side of road
668	Older rural residence observed on north side of road

MDT archeologists suggest that since this segment follows Clover Creek and then crosses Shotgun Creek, Red Bank Creek, and the Little Muddy, buried campsites in the alluvial soils along the margins of these creeks can be expected. (MDT, 2006)

5.2 MT 16 – Culbertson to Medicine Lake

One site was found listed on the NRHP that would fall within the MT 16 – Culbertson to Medicine Lake segment, and is summarized in Table 51.

Table 51. NRHP Sites in MT 16 – Culbertson to Medicine Lake Segment

Name	City	Listed Date	NR Reference No.
Tipi Hills	Medicine Lake	8/1/1975	75001085

Field observations made regarding cultural resources within this segment are summarized in Table 52.

Table 52. Cultural Resources Observed in MT 16 – Culbertson to Medicine Lake Segment

Approximate Milepost	Description
88	Older barn observed on west side of highway
82	Historic farm observed on east side of highway, residence not historic
76.5	Froid cemetery observed on west side of highway
76	Historic farm observed approx. 0.3 miles east of highway
76.25	Historic building observed in Froid across from Fjeseth Field (east side of highway)
75.5	Kvile cemetery observed on east side of highway
73.5	Older rural residence observed on east side of highway
70	Old barn observed on Route 350, 1 mile west of highway
68	Longview Farm observed on east side of highway - may be historic
67.5	Older house and old barn observed on west side of highway
64	Historic house in Medicine Lake observed on east side of highway

Approximate Milepost	Description
64	Older barn observed on Route 573, 0.5 miles east of highway
64	Older home observed on west side of highway

Additional cultural information for the area was found in literature from the Medicine Lake NWR. In the past, Native Americans frequently used this area around Medicine Lake as a campsite while pursuing migrant buffalo herds and waterfowl flocks. Many of the surrounding hills contain rings of stones that mark locations of ceremonial sites or campsites. (USFWS, 1992)

MDT archaeologists expect less in the way of prehistoric archaeology from Medicine Lake to Culbertson compared to other corridor segments, based on the flatter, drier terrain. The exception to this is within the three or four miles of the corridor north of Culbertson. There could be stone circle sites and/or bison kills north of Culbertson in the breaks leading down toward the Yellowstone River. (MDT, 2006)

5.3 MT 16 – Medicine Lake to Plentywood

No sites were found on the NRHP list that would fall within the MT 16 – Medicine Lake to Plentywood segment. Field observations made regarding cultural resources within this segment are summarized in Table 53.

Table 53. Cultural Resources Observed in MT 16 – Medicine Lake to Plentywood Segment

Approximate Milepost	Description
62.5	Marked historic site observed on west side of highway (Flandrem)
60	Older buildings observed on east side of highway
52.5	Old farm buildings in disrepair observed on west side of highway
51.5	Older buildings observed on east side of highway at Lowell Valley Rd
50	Old historic (possibly school?) building observed on east side of highway in Antelope
50	Older homes observed in Antelope
50	Historic structure observed on west side of highway in Antelope
49	Historic buildings observed on west side of highway
47.5	Old barn and outbuildings/new home observed on east side of highway
47.5	Old barn and outbuildings/new home observed on west side of highway
47	Older farm observed on east side of highway
46	Older home observed on west side of highway
45	Older home observed on west side of highway

Approximate Milepost	Description
43.5	Drive in movie theater observed on north side of highway

MDT archaeologists expect that since this segment follows the eastern side of the Big Muddy Valley, several archaeological sites may be expected. Where the road crosses perennial tributaries of Big Muddy Creek, several buried campsites should be expected. Buried campsites can be particularly important archaeological finds because cultural materials are almost always better preserved in buried rather than surface contexts. (MDT, 2006)

5.4 MT 16 – Plentywood to the Canadian Border

One site was found on the NRHP list that would fall within the MT 16 – Plentywood to the Canadian Border segment, and is summarized in Table 54.

Table 54. NRHP Sites in MT 16 – Plentywood to the Canadian Border Segment

Name	City	Listed Date	NR Reference No.
Raymond Grain Elevators Historic District	Raymond	10/27/1993	93001148

Field observations made regarding cultural resources within this segment are summarized in Table 55.

Table 55. Cultural Resources Observed in MT 16 – Plentywood to the Canadian Border Segment

Approximate Milepost	Description
1.5	Older barn observed on east side of highway
3	Older buildings observed on west side of highway
4	Older farmstead observed on east side of highway
7	Grain elevators observed on west side of highway, near Raymond
8	Older home observed on west side of highway
10	Old barn with new house observed on east side of highway
15	Old building in disrepair observed on east side of highway

MDT archaeologists expect to see several archaeological sites along the margins of the glacial potholes in this segment. (MDT, 2006)

6 Utilities

The following GIS-based utility information was reviewed in the study corridor (Figure 16):

- Petroleum pipelines
- Power lines
- Natural gas wells
- Injection wells
- Oil wells
- Water source wells
- Mine sites

6.1 US 2 – North Dakota State Line to Culbertson

A petroleum pipeline extends along the north side of this segment. A power line also extends along the north side of this segment, south of the petroleum pipeline. Natural gas wells are located approximately ½ mile south of the highway at approximate MP 658 and 645. Several oil wells are present in the area of the segment, including a cluster north of Bainville. It appears that only one oil well occurs within the 1-mile buffer of the highway, approximately 0.75 miles south of the highway near MP 653. No mine sites are located with the 1-mile buffer of the highway.

6.2 MT 16 – Culbertson to Medicine Lake

The petroleum pipeline that extends along the north side of US 2 crosses this segment near MP 87.5. The power line that also extends along the north side of US 2, south of the petroleum pipeline, crosses this segment near MP 88.5. A natural gas well is located in Froid, within ¼ mile east of the highway near MP 76. Another natural gas well is located in Medicine Lake, within ¾ mile west of the highway near MP 64. Fewer oil wells are present in the area of this segment. Two oil wells occur within the 1-mile buffer of the highway, located in Culbertson south of MP 87, on the east side of the highway. No mine sites are located with the 1-mile buffer of the highway.

6.3 MT 16 – Medicine Lake to Plentywood

A petroleum pipeline crosses this segment near MP 55. A power line crosses this segment near MP 62. Three natural gas wells are located within the one-mile buffer of the highway. One is located in Reserve, near MP 56, approximately one mile west of the highway. Another is located north of Antelope less than ¼ mile from the highway near MP 50.5. The third is located in Plentywood within ¼ mile of the highway near MP 41.5. Oil wells are present throughout the surrounding area of this segment. The first occurs near MP 63, approximately one mile east of the highway. Another is located near MP 58.5 approximately one mile west of the highway. One well is located near Reserve, near MP 56.5, approximately ¾ mile west of the highway. A cluster of oil wells occurs near MP 49, approximately ¾ mile west of the highway. No mine sites are located with the 1-mile buffer of the highway.

6.4 MT 16 – Plentywood to the Canadian Border

This segment does not cross any petroleum pipelines or power lines. A natural gas well is located in Raymond, within ½ mile west of the highway near MP 7. Fewer oil wells are present in the area of this segment, mainly clustered west of the Town of Raymond. No oil wells occur within the 1-mile buffer of the highway. No mine sites are located with the 1-mile buffer of the highway.

7 References

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Appendix A: Figures

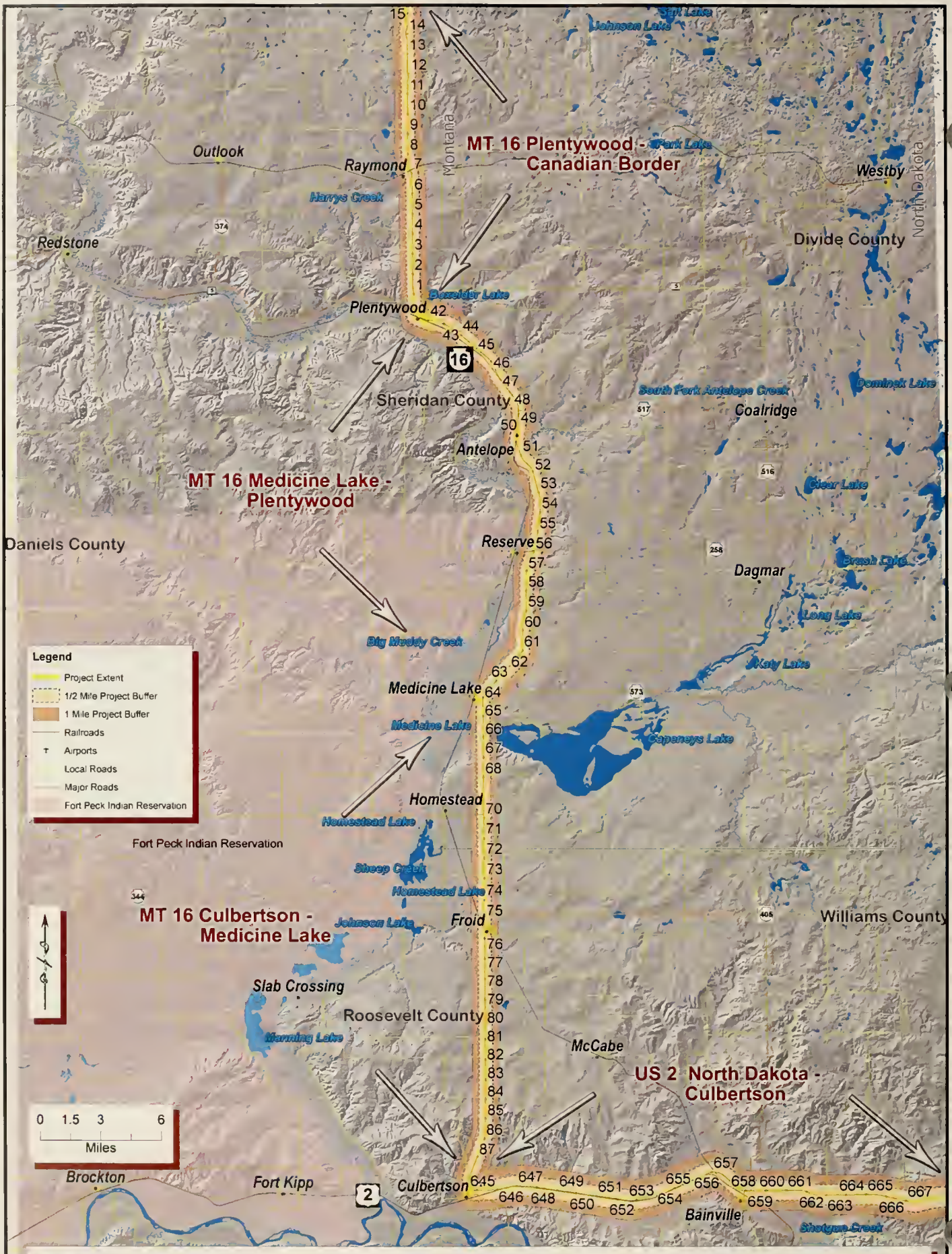


Figure 1:
Overview / Environmental Scan
Transportation Regional Economic Development Study
Theodore Roosevelt Expressway

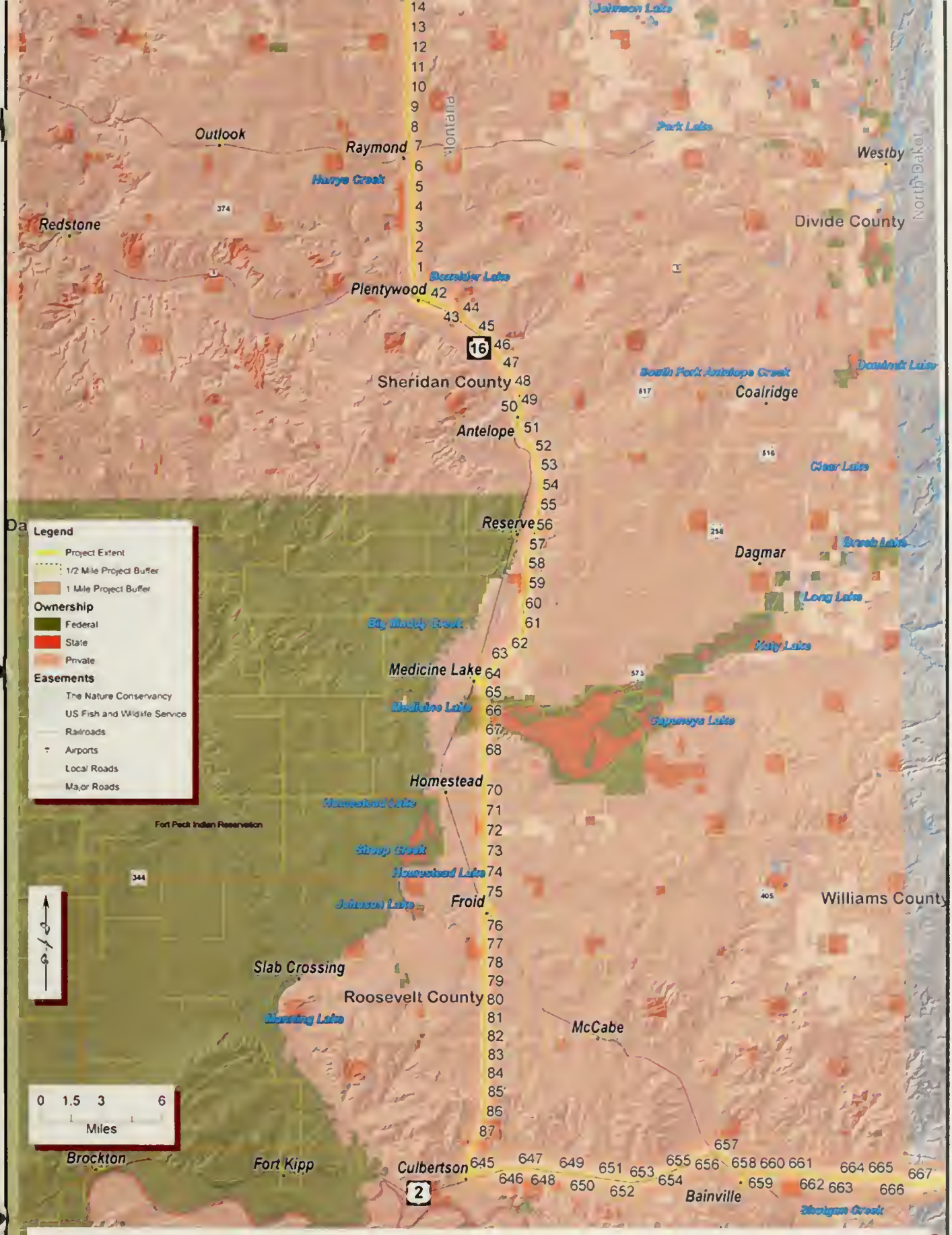


Figure 2:
Ownership / Environmental Scan
Transportation Regional Economic Development Study
Theodore Roosevelt Expressway

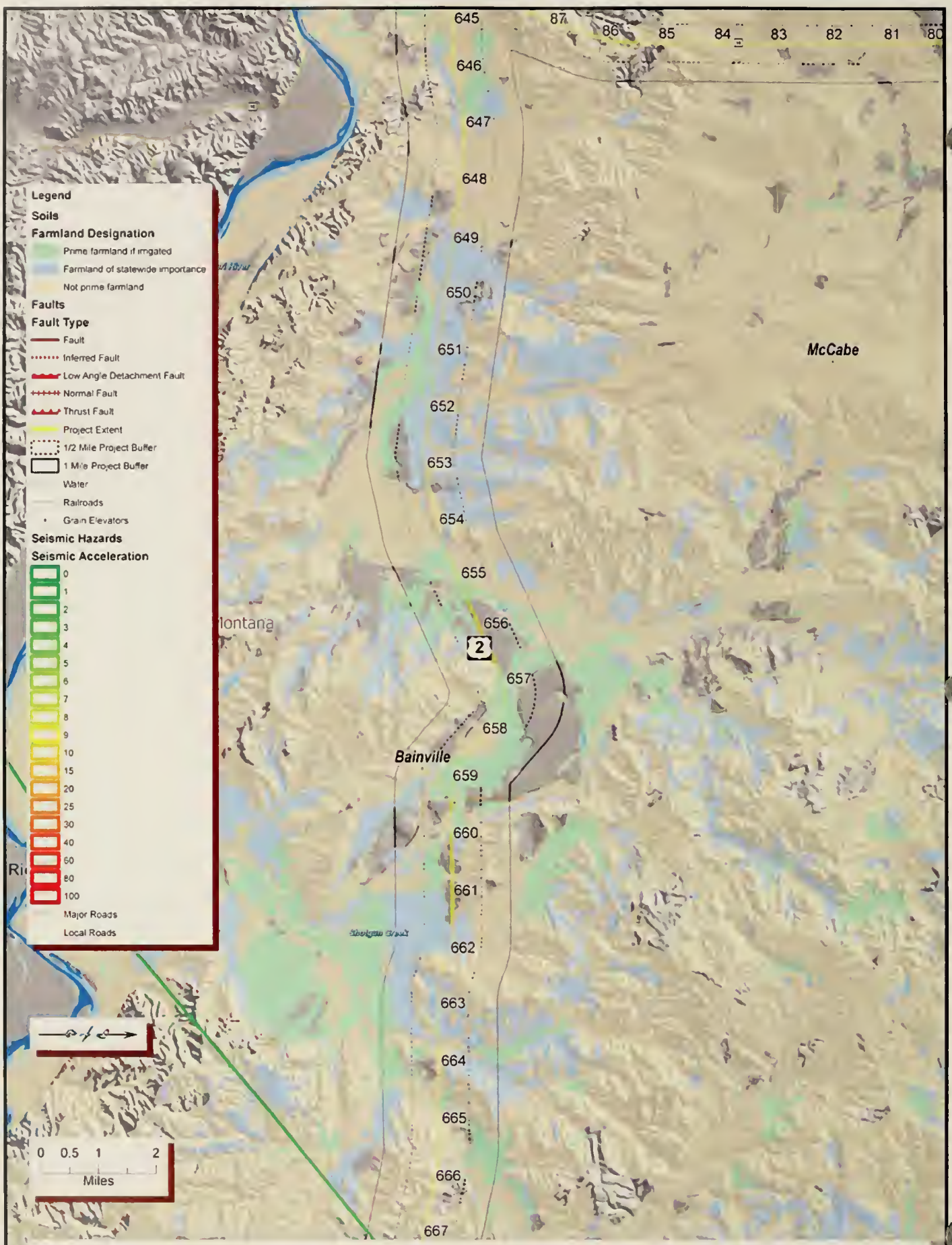


Figure 3:
Prime Farmland & Geology / North Dakota to Culbertson
Transportation Regional Economic Development Study
Theodore Roosevelt Expressway

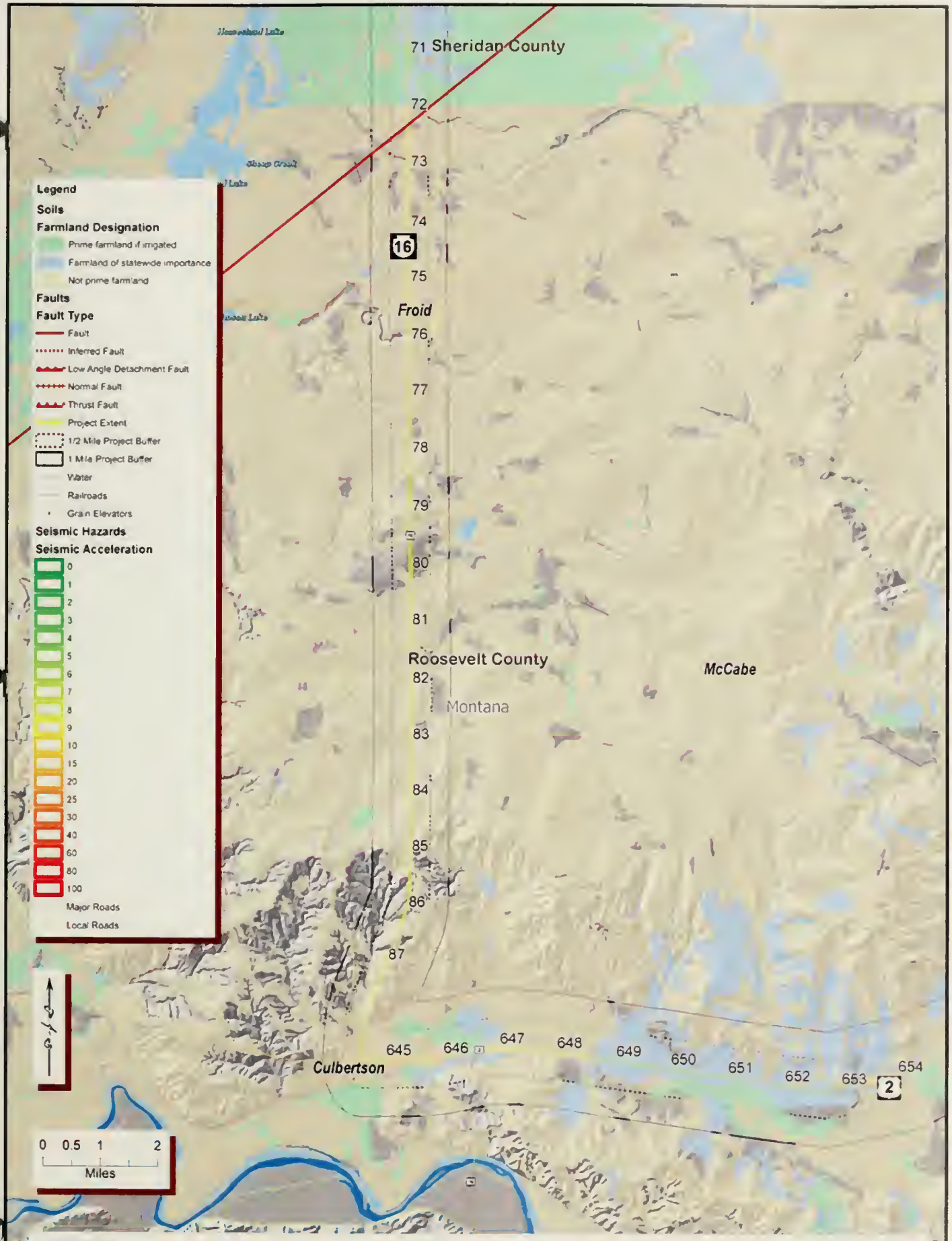


Figure 4:
Prime Farmland & Geology / Culbertson to MP 71
Transportation Regional Economic Development Study
Theodore Roosevelt Expressway

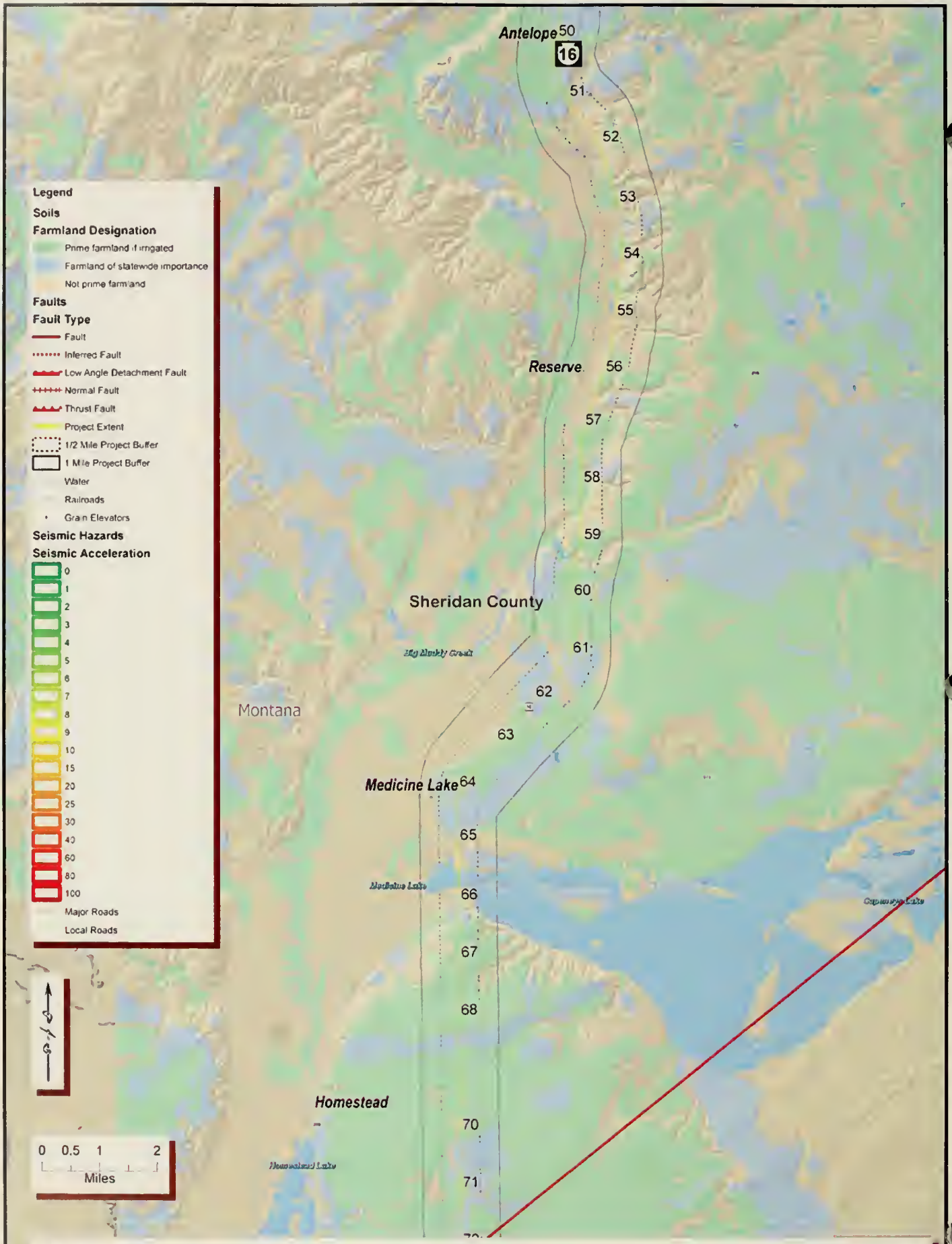


Figure 5:
Prime Farmland & Geology / MP 71 to Antelope
Transportation Regional Economic Development Study
Theodore Roosevelt Expressway

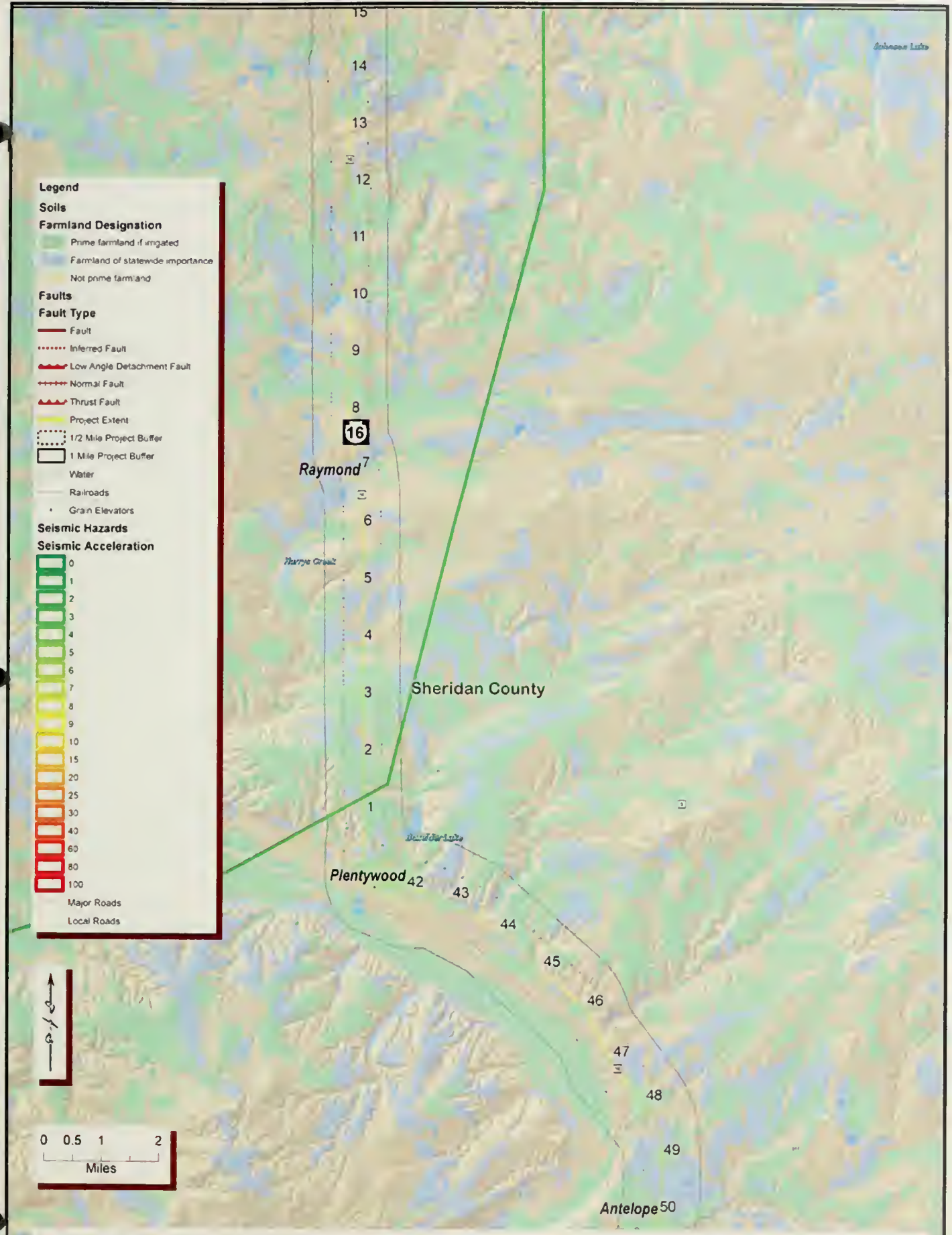


Figure 6 :
Prime Farmland & Geology / Antelope to Canada
Transportation Regional Economic Development Study
Theodore Roosevelt Expressway

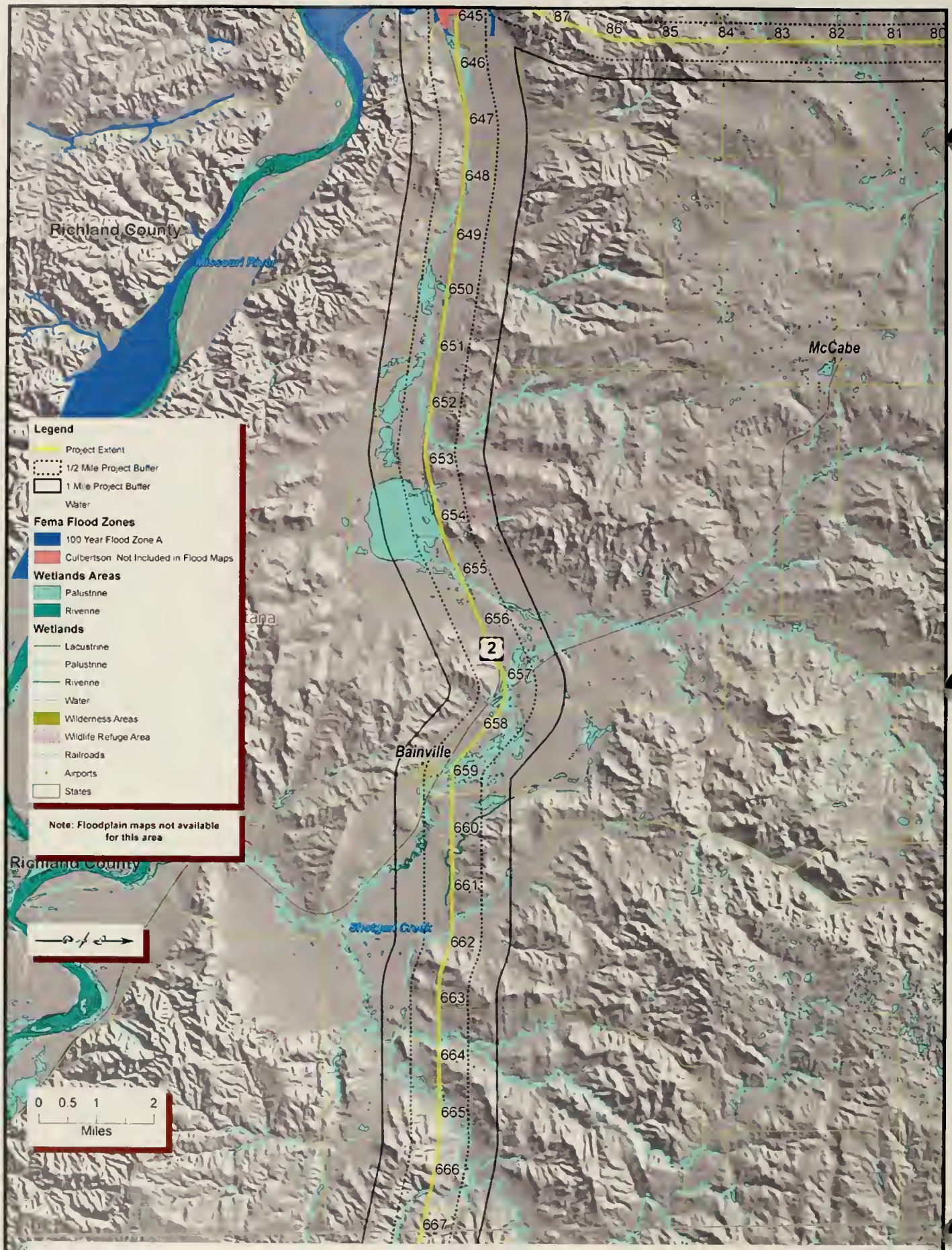


Figure 7:
Surface Water and Wetlands / North Dakota to Culbertson
Transportation Regional Economic Development Study
Theodore Roosevelt Expressway

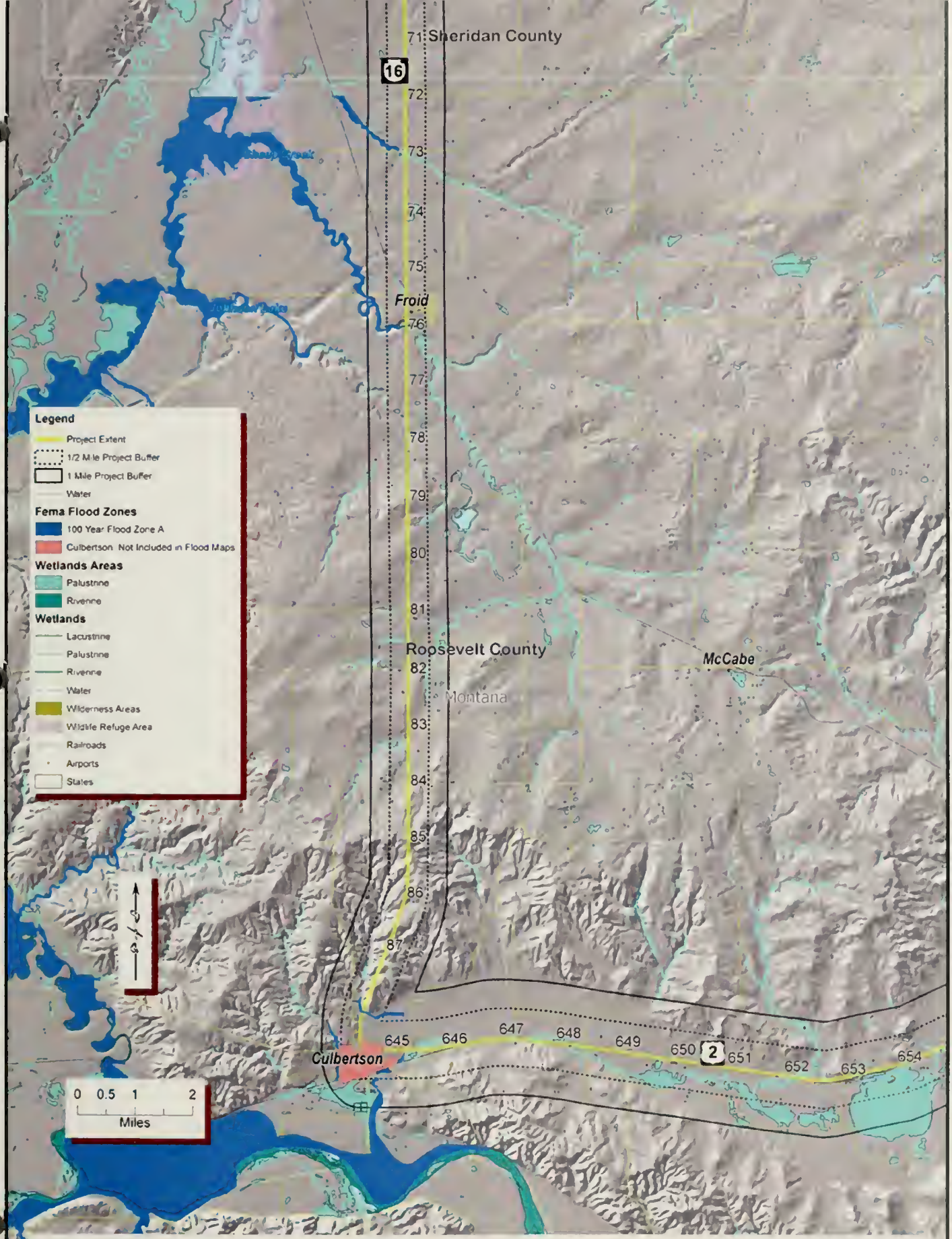


Figure 8:
Surface Water and Wetlands / Culbertson to MP 71
Transportation Regional Economic Development Study
Theodore Roosevelt Expressway

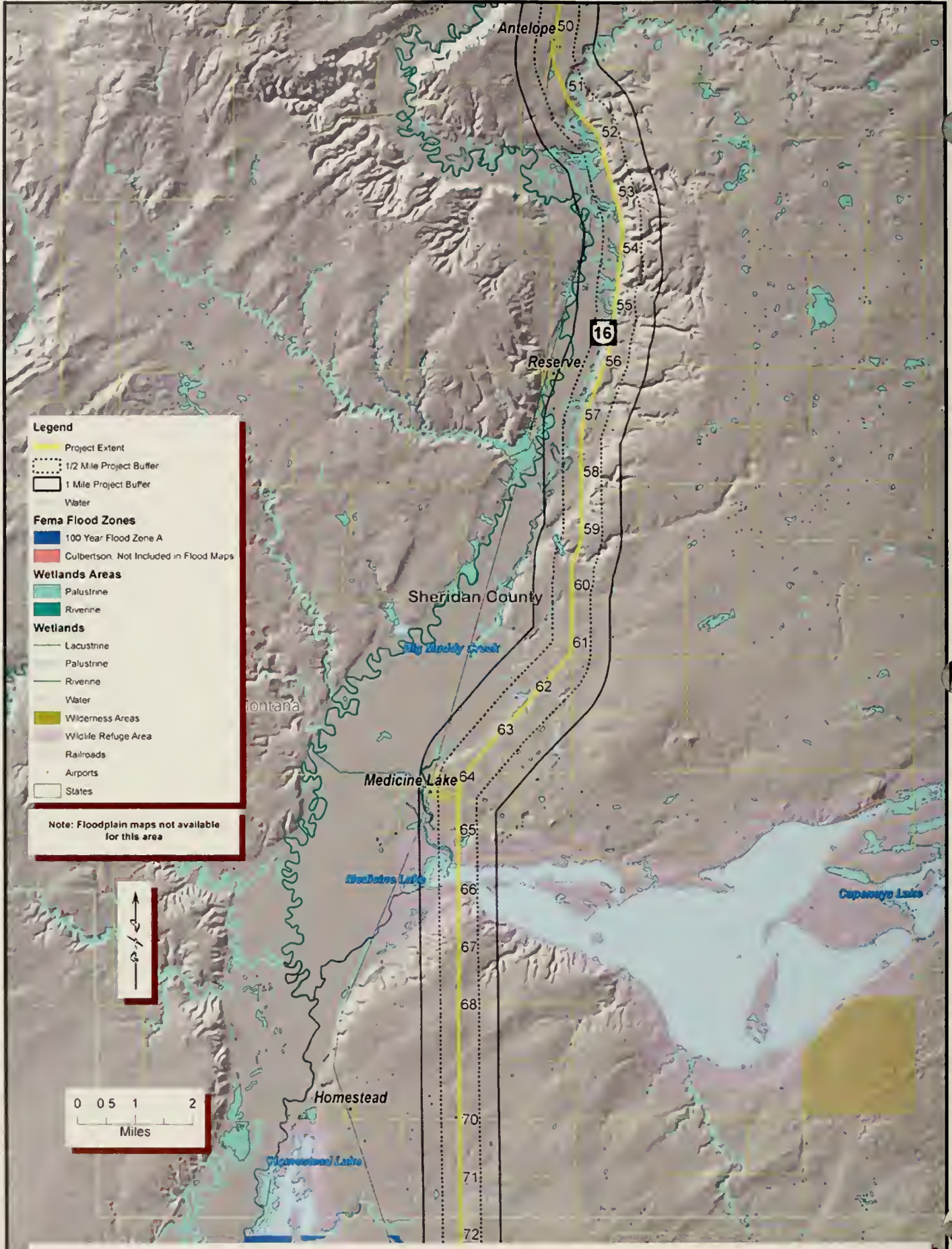


Figure 9:
Surface Water and Wetlands / MP 71 to Antelope
Transportation Regional Economic Development Study
Theodore Roosevelt Expressway

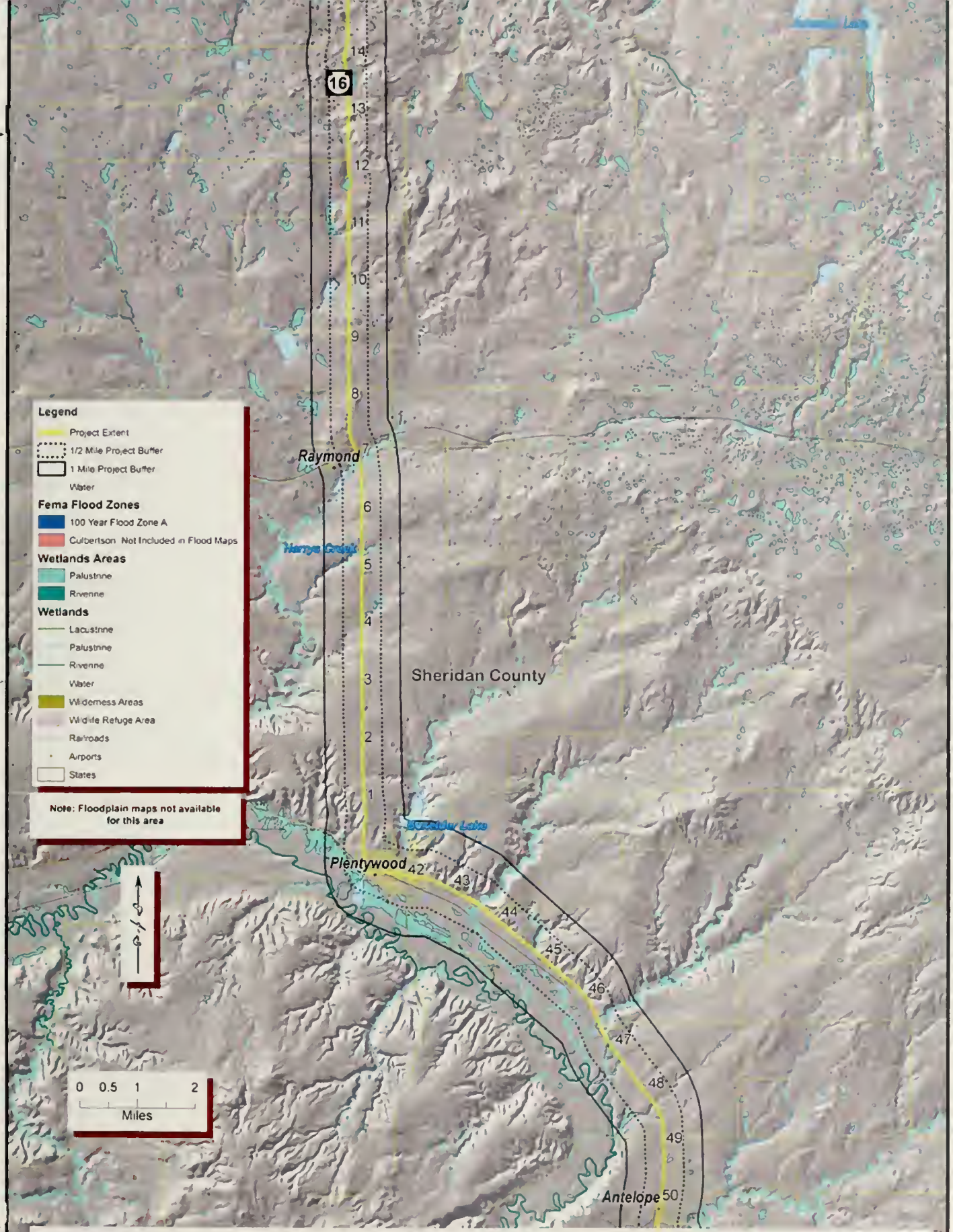


Figure 10:
Surface Water and Wetlands / Antelope to Canada
Transportation Regional Economic Development Study
Theodore Roosevelt Expressway

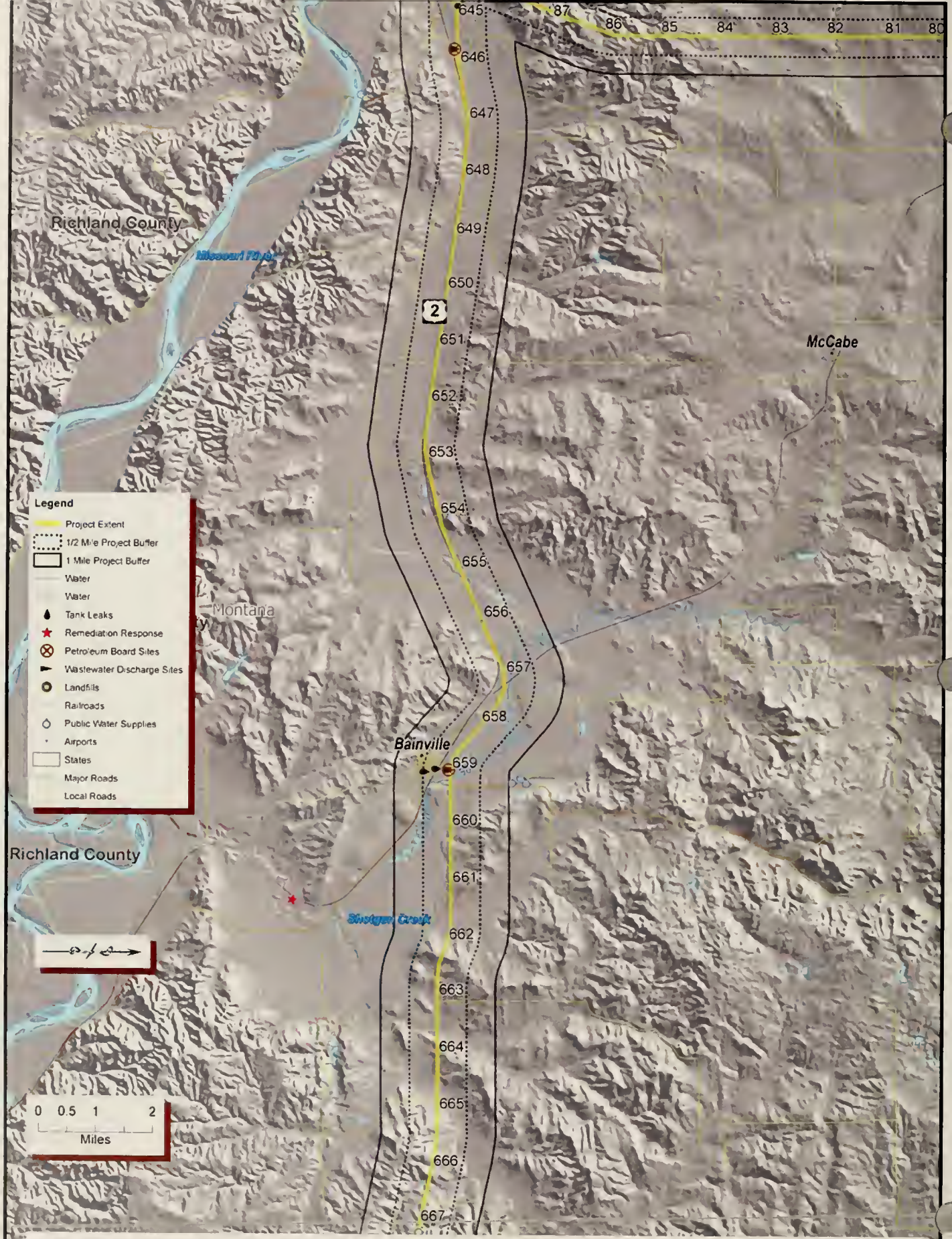


Figure 11:
Hazardous Waste Sites / North Dakota to Culbertson
Transportation Regional Economic Development Study
Theodore Roosevelt Expressway

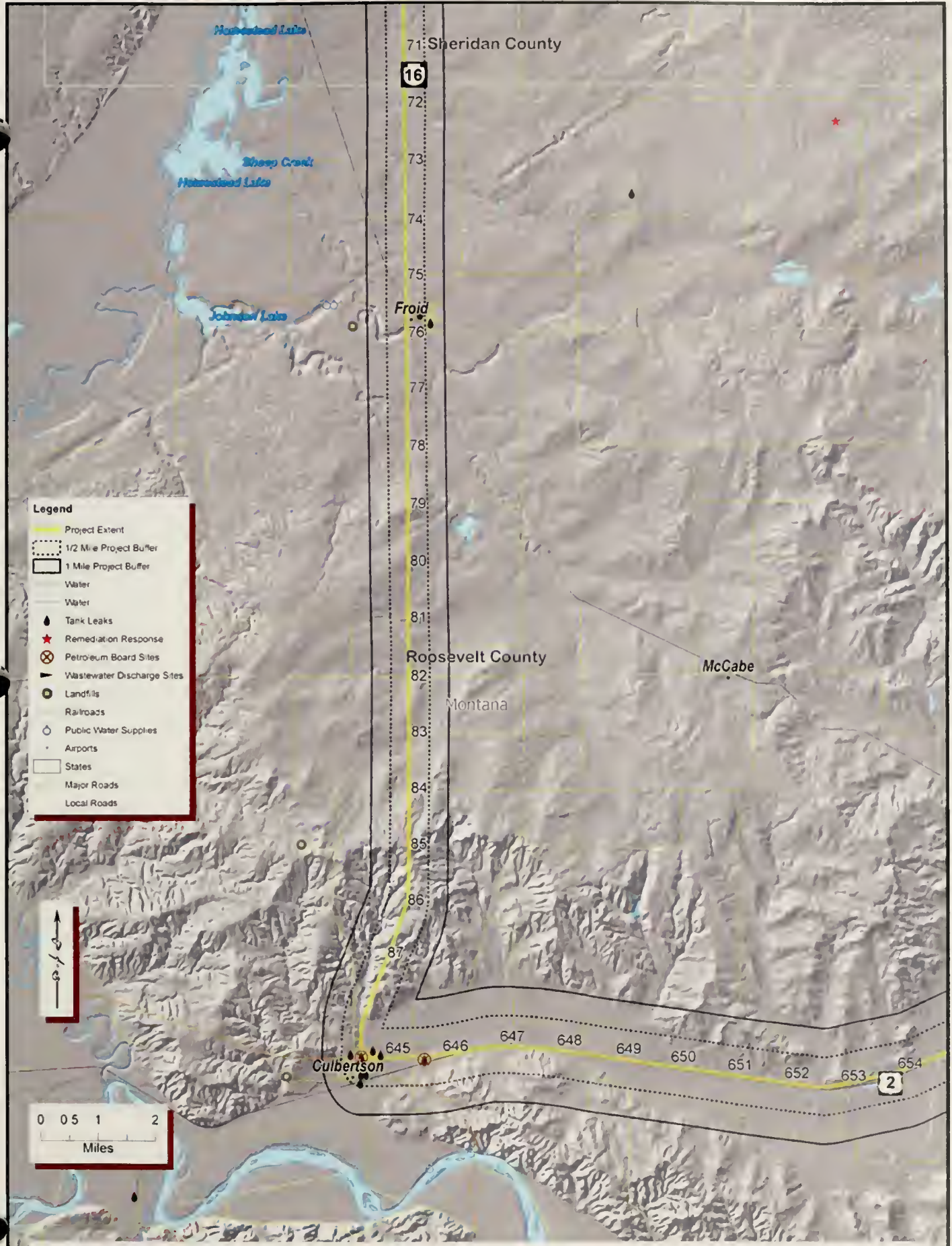


Figure 12:
Hazardous Waste Sites / Culbertson to MP 71
Transportation Regional Economic Development Study
Theodore Roosevelt Expressway

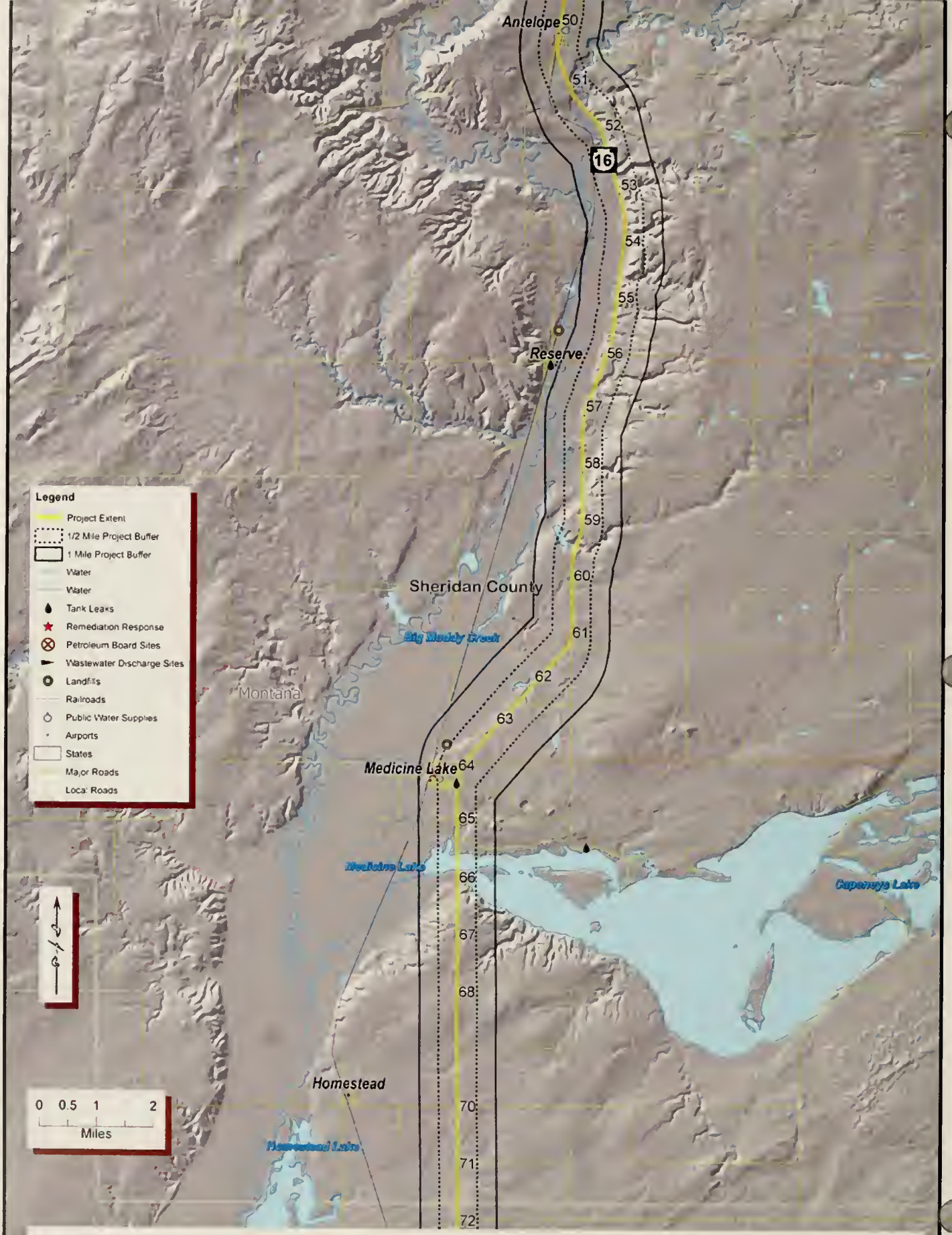


Figure 13:
Hazardous Waste Sites / MP 71 to Antelope
Transportation Regional Economic Development Study
Theodore Roosevelt Expressway

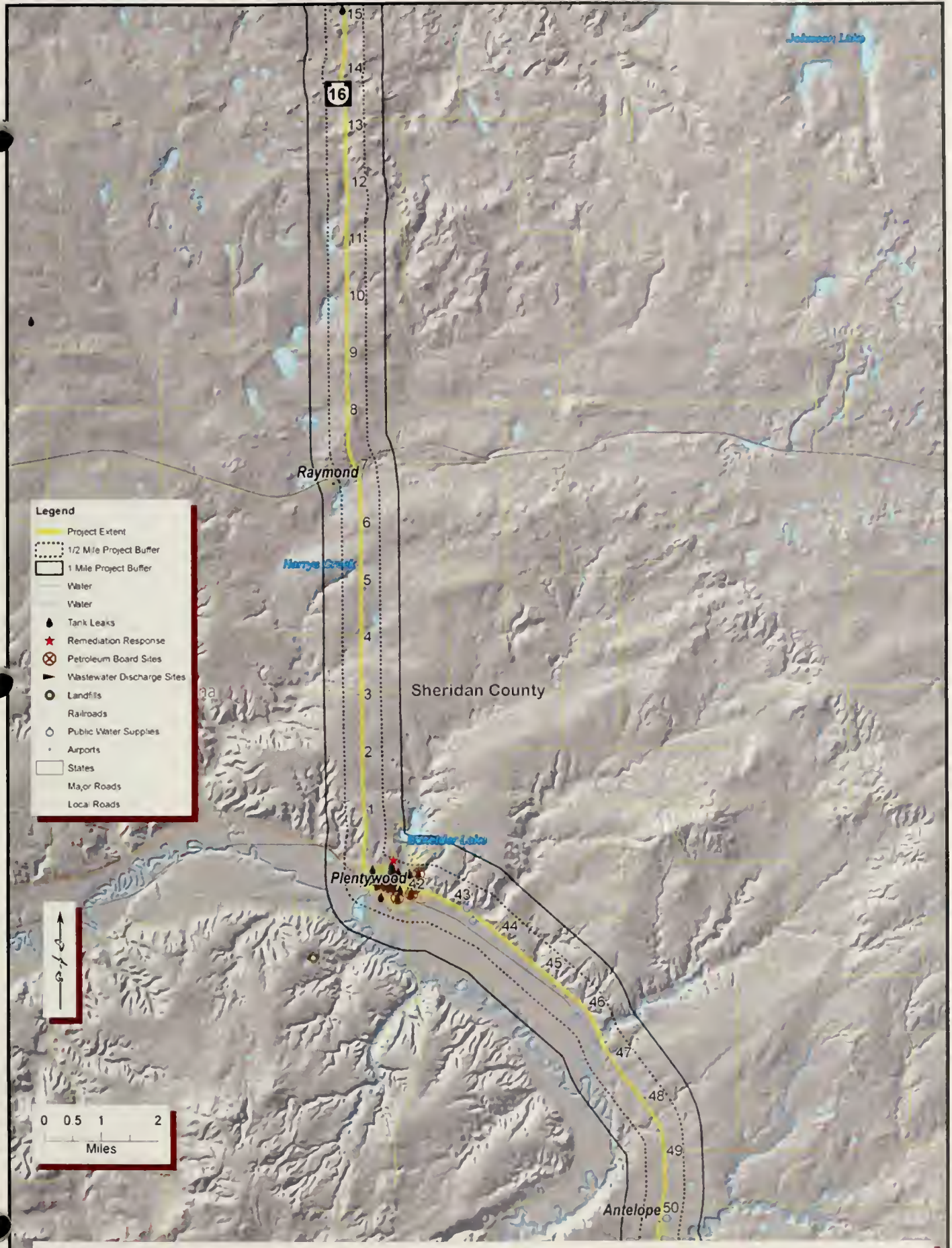


Figure 14:
Hazardous Waste Sites / Antelope to Canada
Transportation Regional Economic Development Study
Theodore Roosevelt Expressway

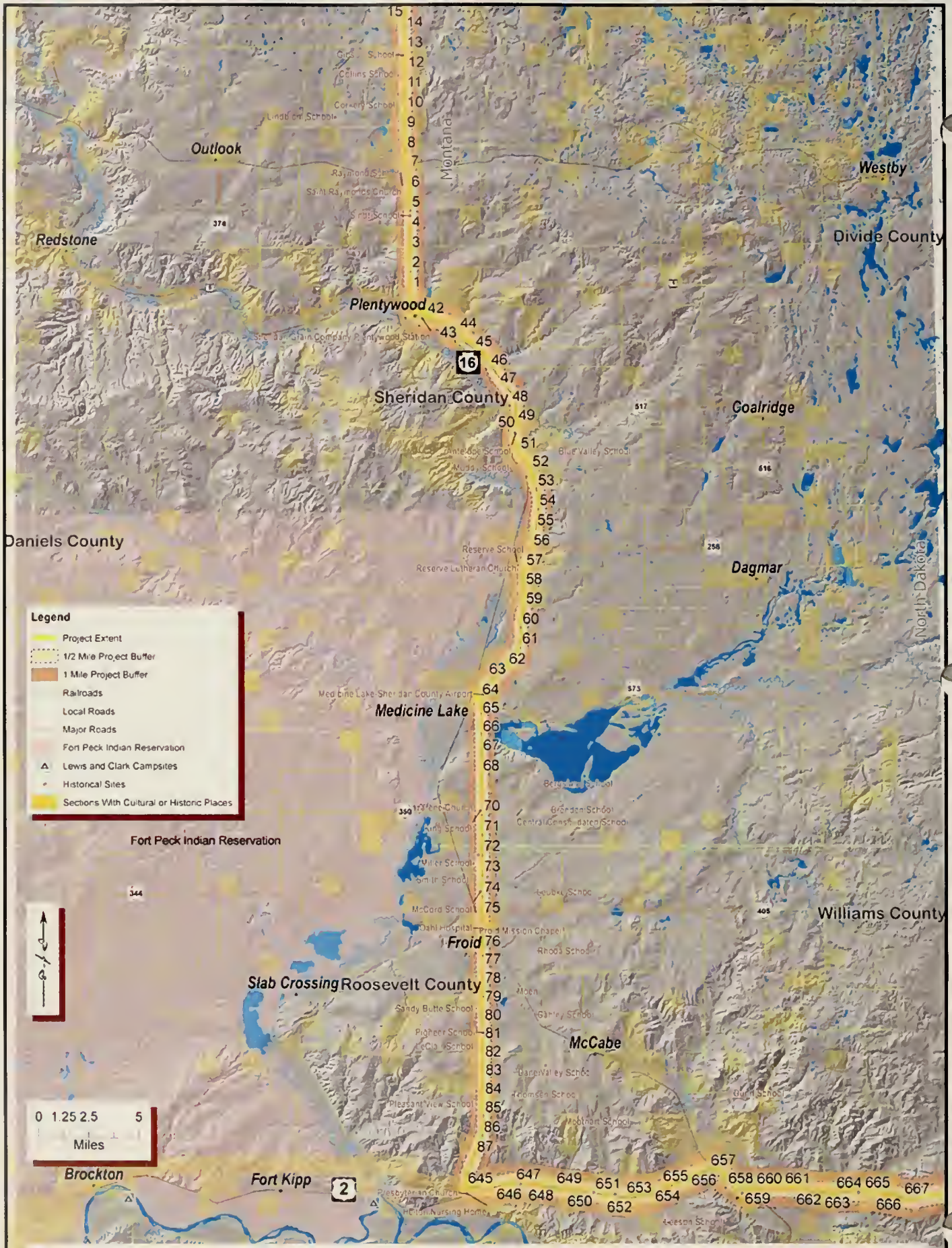


Figure 15:
Cultural Resources / Environmental Scan
Transportation Regional Economic Development Study
Theodore Roosevelt Expressway

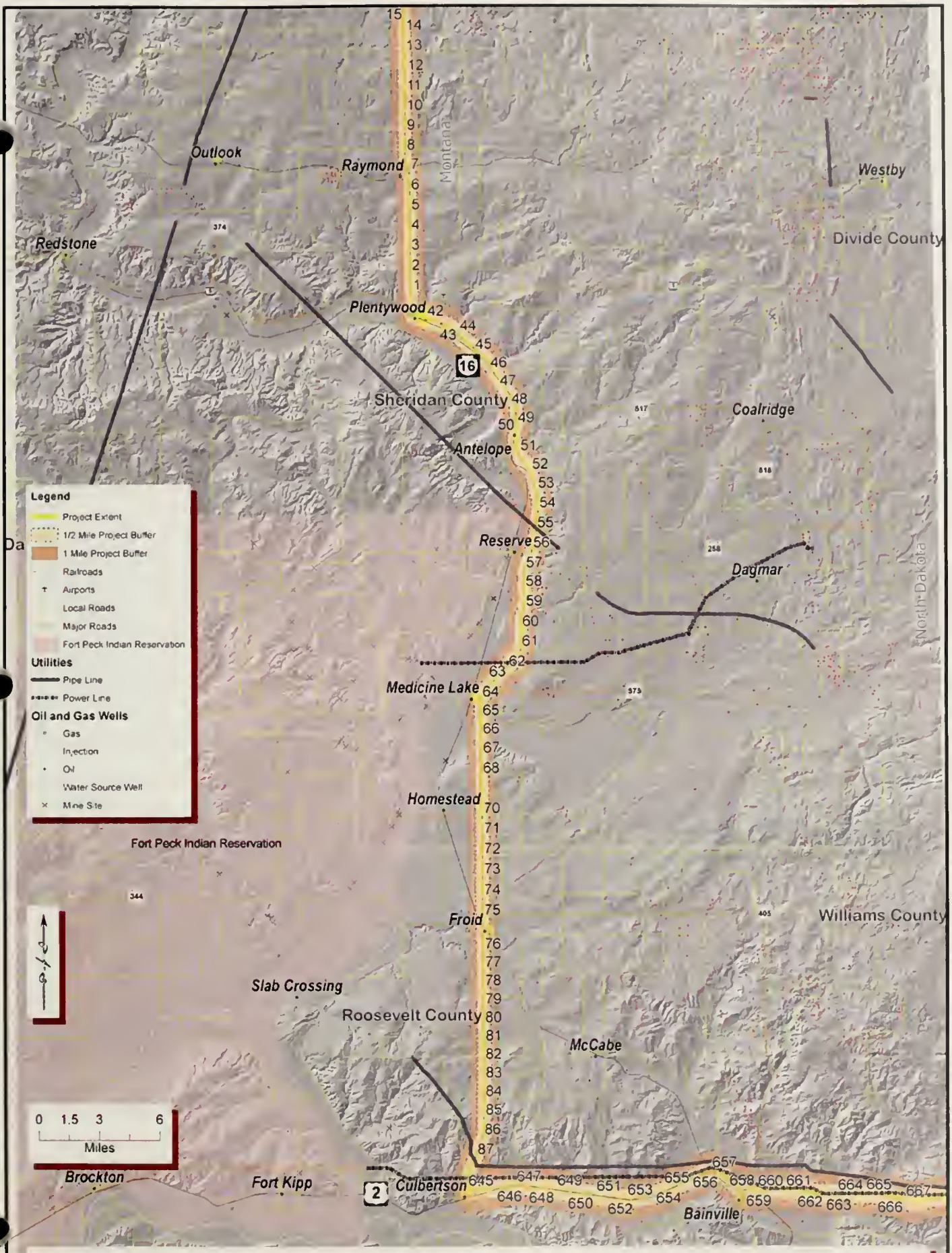


Figure 16:
Utilities / Environmental Scan
Transportation Regional Economic Development Study
Theodore Roosevelt Expressway

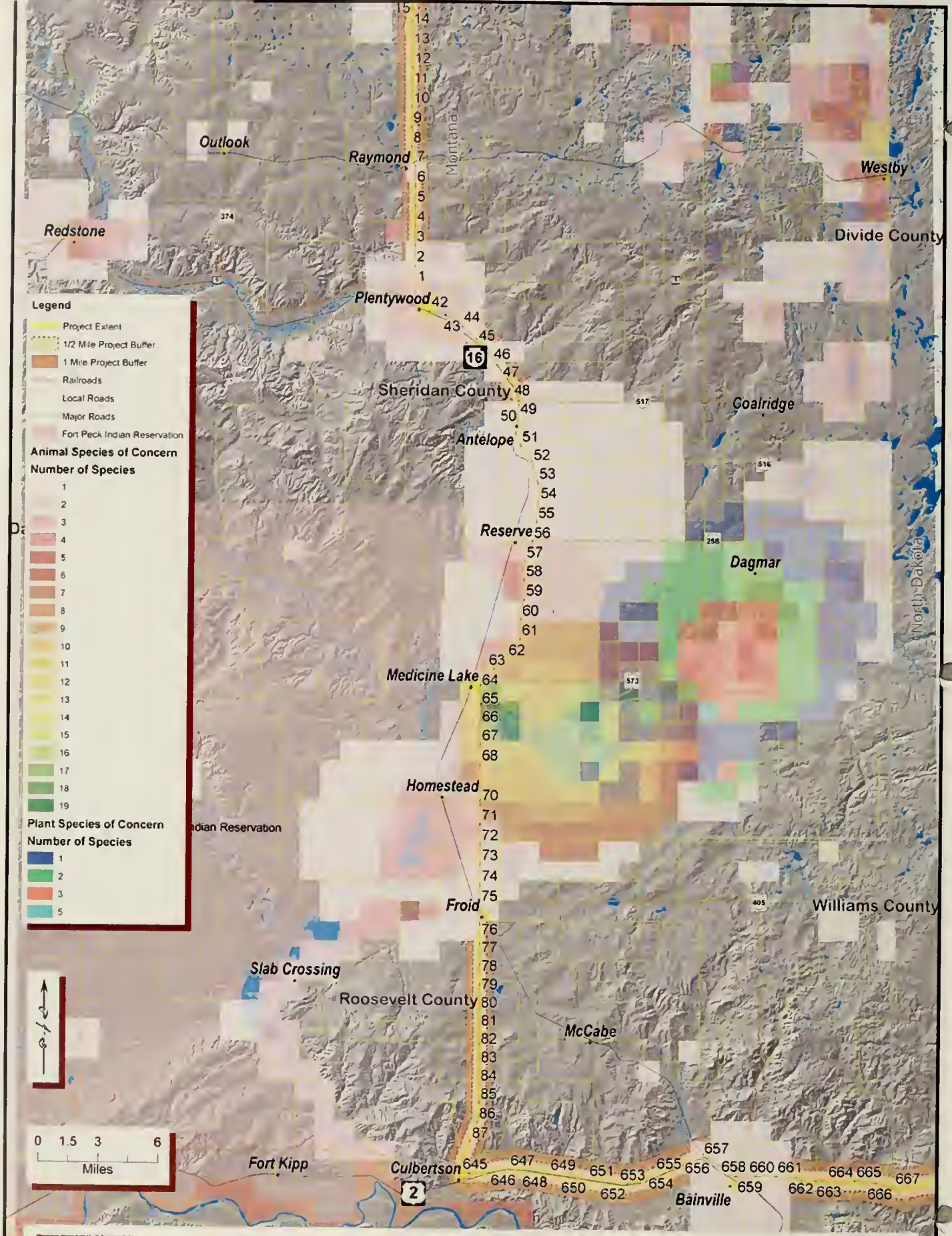
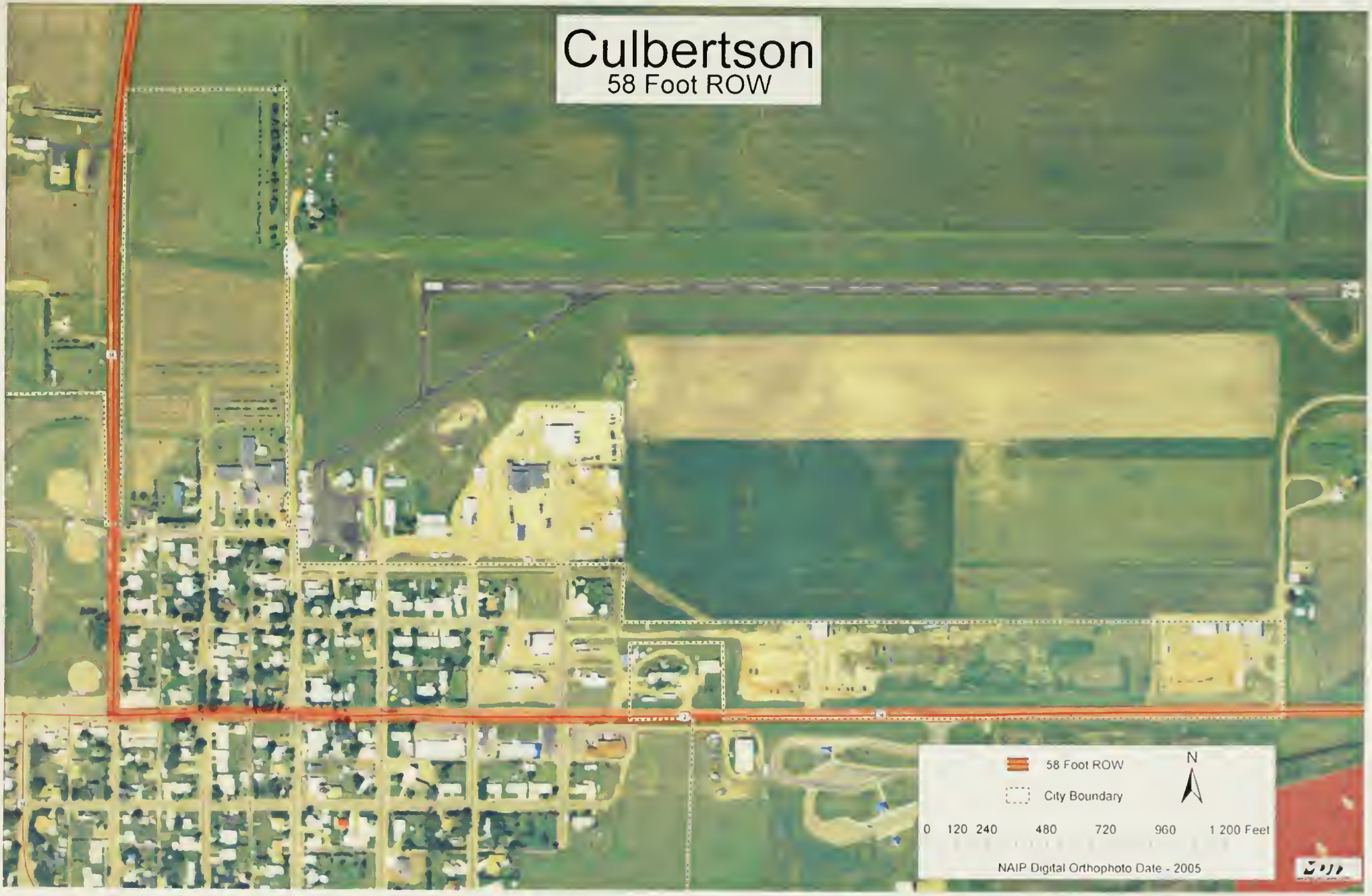


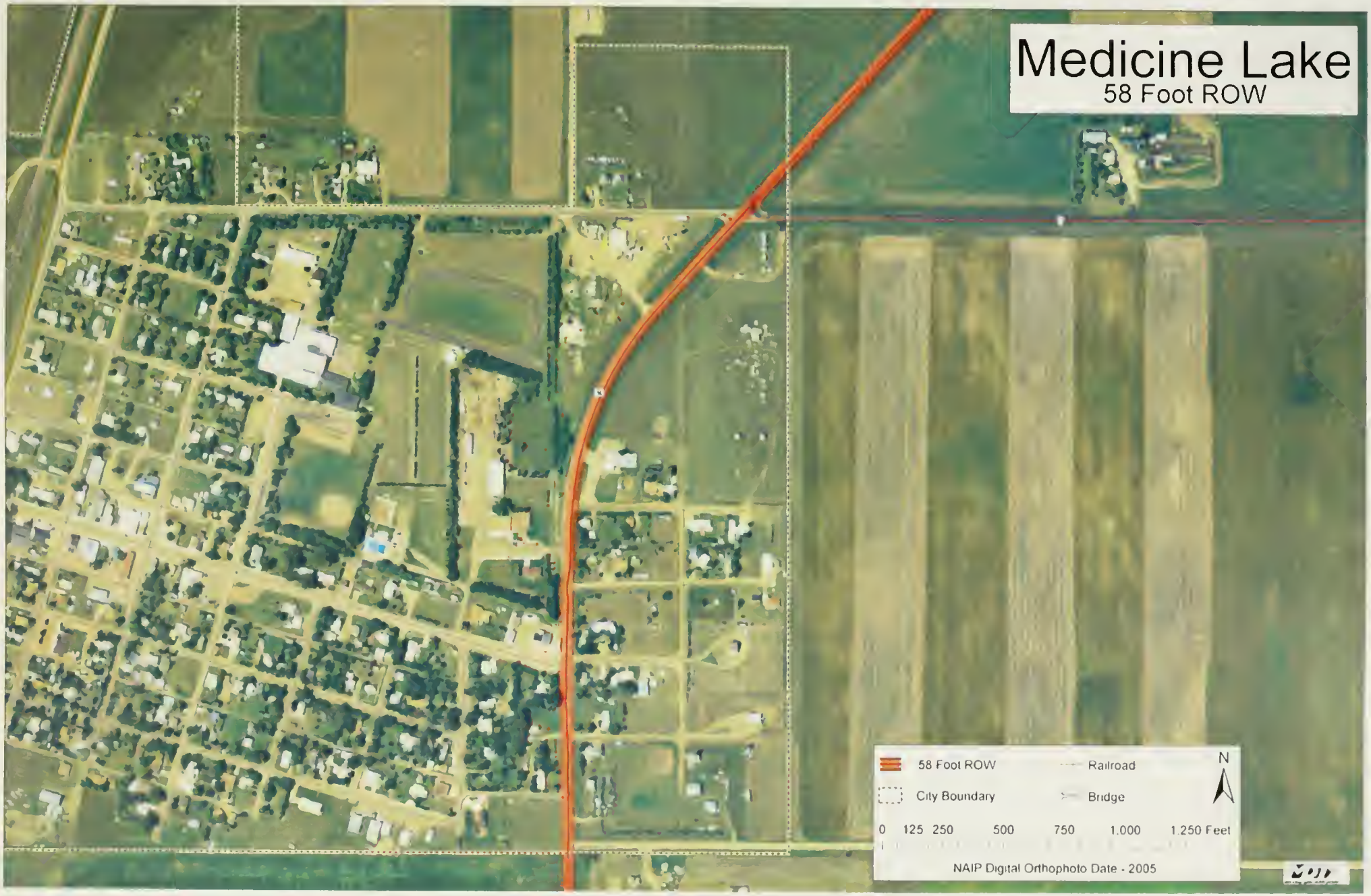
Figure 17:
Species of Concern / Environmental Scan
Transportation Regional Economic Development Study
Theodore Roosevelt Expressway

Antelope
58 Foot ROW
58 Foot ROW
Railroad
City Boundary
Bridge
N
0 120 240 480 720 960 1,200 Feet
NAIP Digital Orthophoto Date - 2005

Bainville
58 Foot ROW
58 Foot ROW
Railroad
City Boundary
Bridge
N
0 120 240 480 720 960 1,200 Feet
NAIP Digital Orthophoto Date - 2005


Culbertson
58 Foot ROW
58 Foot ROW
City Boundary
N
0 120 240 480 720 960 1 200 Feet
NAIP Digital Orthophoto Date - 2005

Froid
58 Foot ROW
58 Foot ROW
Railroad
City Boundary
Bridge
N
0 130 260 520 780 1,040 1,300 Feet
NAIP Digital Orthophoto Date - 2005


Medicine Lake
58 Foot ROW
58 Foot ROW
Railroad
City Boundary
Bridge
N
0 125 250 500 750 1,000 1,250 Feet
NAIP Digital Orthophoto Date - 2005

Plentywood
58 Foot ROW
58 Foot ROW
Railroad
City Boundary
Bridge
N
0 210 420 840 1 260 1,680 2,100 Feet
NAIP Digital Orthophoto Date - 2005

Appendix B: Photos

TRED Study - Environmental Scan Windshield Survey
Photo Log

Photo: 05
Date: 8/1/06
Location: MT 16
Approx MP: 84
Viewing Dir: N
Description: Block management area

Photo: 06
Date: 8/1/06
Location: MT 16
Approx MP: 84
Viewing Dir: N
Description: Viewing north along highway, from just north of MP 84

Photo: 07
Date: 8/1/06
Location: MT 16
Approx MP: 84
Viewing Dir: S
Description: Viewing south along highway, from just north of MP 84

Photo: 08
Date: 8/1/06
Location: MT 16
Approx MP: 82
Viewing Dir: E
Description: Historic farm on east side of highway

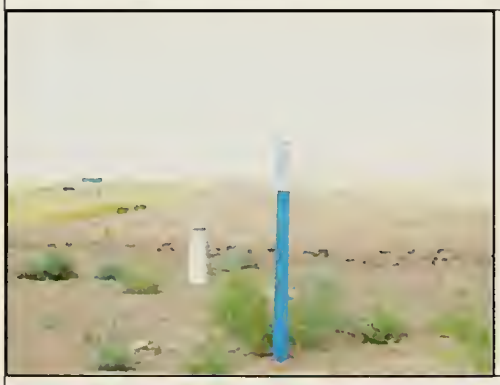


Photo: 09
Date: 8/1/06
Location: MT 16
Approx MP: 82
Viewing Dir: S
Description: Water at southwest corner of MT 16 and RD 2052

Photo: 10
Date: 8/1/06
Location: MT 16
Approx MP: 81
Viewing Dir: E
Description: Soil and Water Conservation District Research Farm

Photo: 11
Date: 8/1/06
Location: MT 16
Approx MP: 81
Viewing Dir: E
Description: Soil and Water Conservation District Research Farm

Photo: 12
Date: 8/1/06
Location: MT 16
Approx MP: 79
Viewing Dir: S
Description: Viewing south along highway, from MP 79

TRED Study - Environmental Scan Windshield Survey
Photo Log

Photo: 14
Date: 8/1/06
Location: MT 16
Approx MP: 78
Viewing Dir: W
Description:
BOR sign

Photo: 16
Date: 8/1/06
Location: MT 16
Approx MP: 76
Viewing Dir: W
Description:
Froid Cemetery

Photo: 17
Date: 8/1/06
Location: MT 16
Approx MP: 76
Viewing Dir: E
Description:
Historic farm, RD 2046, south of Froid

Photo: 18
Date: 8/1/06
Location: MT 16
Approx MP: 76
Viewing Dir:
S/SE
Description:
Bridge near MP 76

Photo: 19
Date: 8/1/06
Location: MT 16
Approx MP: 76
Viewing Dir:
S/SE
Description:
Fjeseth Field, Froid

Photo: 20
Date: 8/1/06
Location: MT 16
Approx MP: 75.5
Viewing Dir: E
Description:
Kvile Cemetery, north side of Froid

Photo: 21
Date: 8/1/06
Location: MT 16
Approx MP: 67.5
Viewing Dir: W
Description: Old barn

Photo: 22
Date: 8/1/06
Location: MT 16
Approx MP: 66
Viewing Dir: N
Description:
Crossing at Medicine Lake Wildlife Refuge

TRED Study - Environmental Scan Windshield Survey
Photo Log

Photo: 23
Date: 8/1/06
Location: MT 16
Approx MP: 66
Viewing Dir: N/NE
Description: Medicine Lake Wildlife Refuge

Photo: 24
Date: 8/1/06
Location: MT 16
Approx MP: 66
Viewing Dir: N/NW
Description: Medicine Lake Wildlife Refuge

Photo: 25
Date: 8/1/06
Location: MT 16
Approx MP: 65.5
Viewing Dir: E
Description: Welcome sign at Refuge

Photo: 26
Date: 8/1/06
Location: MT 16
Approx MP: 65.5
Viewing Dir: S
Description: Refuge

Photo: 30
Date: 8/1/06
Location: MT 16
Approx MP: 64
Viewing Dir: W
Description: Herman Oil, Medicine Lake

Photo: 31
Date: 8/1/06
Location: MT 16
Approx MP: 62.5
Viewing Dir: W
Description: Farmstead, at intersection with Flandem Rd.

Photo: 32
Date: 8/1/06
Location: MT 16
Approx MP: 61.75
Viewing Dir: W
Description: Oil tanks and sludgy pond

Photo: 34
Date: 8/1/06
Location: MT 16
Approx MP: 62.5
Viewing Dir: E
Description: Flandrem – original site of Medicine Lake

TRED Study - Environmental Scan Windshield Survey
Photo Log

Photo: 35
Date: 8/1/06
Location: MT 16
Approx MP: 62.5
Viewing Dir: E
Description: Flandrem – original site of Medicine Lake

Photo: 37
Date: 8/1/06
Location: MT 16
Approx MP: 56
Viewing Dir: S
Description: Reserve Creek between MT 16 and Reserve, from bridge on MT 258

Photo: 40
Date: 8/1/06
Location: MT 16
Approx MP: 52
Viewing Dir: W
Description: Wetlands, south of MP 52

Photo: 42
Date: 8/1/06
Location: MT 16
Approx MP: 50
Viewing Dir: NE
Description: Northeast corner of Davis and Railroad, Antelope

Photo: 44
Date: 8/1/06
Location: MT 16
Approx MP: 50
Viewing Dir: E
Description: Along Davis Rd in Antelope

Photo: 46
Date: 8/1/06
Location: MT 16
Approx MP: 49
Viewing Dir: W
Description: Historic home

Photo: 47
Date: 8/1/06
Location: MT 16
Approx MP: 42
Viewing Dir: NW
Description: Northwest corner of MT 16 and Main, Plentywood

Photo: 48
Date: 8/1/06
Location: MT 16
Approx MP: 42
Viewing Dir: W
Description: Plentywood, viewing west toward Main

TRED Study - Environmental Scan Windshield Survey
Photo Log

Photo: 49
Date: 8/1/06
Location: MT 16
Approx MP: 42.5
Viewing Dir: N/NE
Description: Park at Mill in Plentywood – ownership unclear

Photo: 50
Date: 8/1/06
Location: MT 16
Approx MP: 42.5
Viewing Dir: E
Description: Viewing east along MT 16 from Mill Dr., Plentywood

Photo: 51
Date: 8/1/06
Location: MT 16
Approx MP: 42.5
Viewing Dir: W
Description: Creek crossing at Mill Dr (Boxelder Creek)

Photo: 52
Date: 8/1/06
Location: MT 16
Approx MP: 42
Viewing Dir: W
Description: Viewing west along MT 16 at Robert St, Plentywood

Photo: 53
Date: 8/1/06
Location: MT 16
Approx MP: 42
Viewing Dir: S
Description: Fueling station near Monroe St., Plentywood

Photo: 54
Date: 8/1/06
Location: MT 16
Approx MP: 1
Viewing Dir: W
Description: V-Trialer (corner of MT 5 and MT 16), Plentywood

Photo: 56
Date: 8/1/06
Location: MT 16
Approx MP: 3.5
Viewing Dir: N
Description: View of highway toward north

Photo: 58
Date: 8/1/06
Location: MT 16
Approx MP: 7
Viewing Dir: NW
Description: Raymond area

TRED Study - Environmental Scan Windshield Survey
Photo Log

Photo: 61
Date: 8/2/06
Location: US 2
Approx MP: 667
Viewing Dir: W
Description: State line along US 2

Photo: 62
Date: 8/2/06
Location: US 2
Approx MP: 663.5
Viewing Dir: N
Description: Farmstead

Photo: 63
Date: 8/2/06
Location: US 2
Approx MP: 662.75
Viewing Dir: N
Description: Farmstead

Photo: 64
Date: 8/2/06
Location: US 2
Approx MP: 661.25
Viewing Dir: N
Description: Fort Union historic marker sign

Photo: 65
Date: 8/2/06
Location: US 2
Approx MP: 659.75
Viewing Dir: W
Description: Landtech Corp #101 – tank farm – 3 in area

Photo: 67
Date: 8/2/06
Location: US 2
Approx MP: 656
Viewing Dir: W
Description: Railroad adjacent to highway, MP 656-646

Photo: 68
Date: 8/2/06
Location: US 2
Approx MP: 645.75
Viewing Dir: W
Description: View into Culbertson, Montola Growers on left

Photo: 69
Date: 8/2/06
Location: US 2
Approx MP: 645
Viewing Dir: W
Description: Culbertson

TRED Study - Environmental Scan Windshield Survey
Photo Log

Photo: 72
Date: 8/2/06
Location: US 2
Approx MP: 645
Viewing Dir: W
Description:
Culbertson just east of MT 16 junction

Photo: 73
Date: 8/2/06
Location: US 2
Approx MP: 645
Viewing Dir: W
Description:
Junction with MT 16, Culbertson

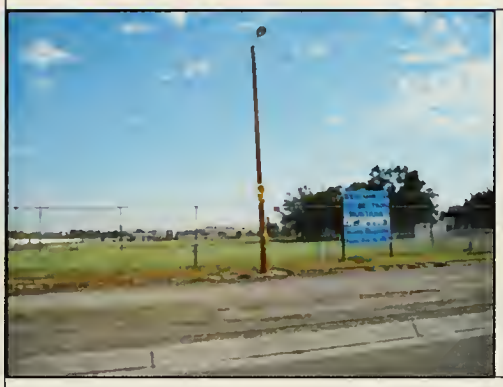


Photo: 74
Date: 8/2/06
Location: US 2
Approx MP: 645
Viewing Dir: N
Description:
Park area at northwest corner of MT 16 and US 2, Culbertson

Appendix C:
Agency Correspondence

United States Department of the Interior

FISH AND WILDLIFE SERVICE
ECOLOGICAL SERVICES
MONTANA FIELD OFFICE
585 SHEPARD WAY
HELENA, MONTANA 59601
PHONE (406) 449-5225, FAX (406) 449-5339

RECEIVED

M.44 MDT (1) December 27, 2006

Hal Fossum
Montana Department of Transportation
Multimodal Planning
2550 Prospect Avenue
P.O. Box 201001
Helena, Montana 59620-1001

Dear Mr. Fossum:

You recently requested comments from the U.S. Fish and Wildlife Service (Service) regarding Montana Department of Transportation's (Department) U.S. Highway 2 / Montana Highway 16 Transportation Regional Economic Development (TRED) Study. The purpose of the TRED Study is to examine whether or not four-lane highway improvements on the portions of the Theodore Roosevelt Expressway in northeastern Montana can be justified by economic, safety, regulatory, or other considerations. You asked the Service to review an initial draft TRED Study report and comment on it relative to the resources for which we are responsible. While we have not seen a copy of the draft report, the Service participated in an environmental review and agency workshop last summer and is familiar with the study area. Based on a review of information we have related to the transportation corridor being considered, we offer the following comments. These comments include input from Service staff at Medicine Lake National Wildlife Refuge and our Ecological Services Montana Field Office.

Montana Highway 16 crosses through a portion of Medicine Lake National Wildlife Refuge (Refuge). Increasing traffic volume and its attendant impacts to wildlife, and the risk of vehicle accidents and pollutant spills on the Refuge that may affect water quality are some aspects of the existing roadway that are of concern to the Service. Future improvements to that roadway that would widen or realign it through the Refuge would also be likely to affect adjacent habitats. Pursuant to section 4(f) of the U.S. Department of Transportation Act of 1966, coordination with Refuge staff would be required relative to these concerns and others that may become apparent if a project is proposed for this stretch of highway.

At this time, the federally-listed threatened or endangered species that may occur in the vicinity of this project corridor are threatened piping plovers (*Charadrius melodus*), threatened bald eagles (*Haliaeetus leucocephalus*) and endangered whooping cranes (*Grus americana*). Critical habitat has been designated for piping plovers in some areas along the TRED study corridor, primarily shoreline habitats of Medicine Lake. Projects proposed by the Department in this area

that may affect these species or designated critical habitat would require consultation with the Service pursuant to section 7 of the Endangered Species Act of 1973.

If a proposed project in this corridor may impact streams or wetlands, permits may eventually be required pursuant to section 404 of the Clean Water Act. In that event, depending on permit type and other factors, the Service may be required to review permit applications and will recommend any protection or mitigation measures to the U.S. Army Corps of Engineers as may appear reasonable and prudent based on the information available at that time.

Although the Service has responsibility for a number of trust resources in the TRED study corridor, we believe that protection of those resources and future highway improvements can both be accomplished. We look forward to working with the Department if construction projects are proposed in this corridor.

Thank you for the opportunity to comment on this transportation corridor study. If you have questions, please contact Jerry Rodriguez, Project Leader, Medicine Lake National Wildlife Refuge at (406) 789-2305, or Scott Jackson, Fish and Wildlife Biologist, Montana Field Office at (406) 449-5225, extension 201.

Sincerely,

R. Mark Wilson
Field Supervisor

Copy to: Jerry Rodriguez, Medicine Lake NWR

DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS, OMAHA DISTRICT
HELENA REGULATORY OFFICE
10 WEST 15TH STREET, SUITE 2200
HELENA MT 59626

RECEIVED
TRANSPORTATION PLANNING

December 13, 2006

Helena Regulatory Office
Phone (406) 441-1375
Fax (406) 441-1380

RE: US 2 / MT 16 TRED Study
Corps File No. 2006 - 244

Ms. Sandra Straehl
Montana Department of Transportation
P.O. Box 201001
Helena, Montana 59620-1001

Dear Ms. Straehl:

I appreciate the opportunity to meet with you and the other Montana Department of Transportation and Federal Highway Administration officials this morning to review the comments previously submitted by my office on the referenced project. This letter provides my summary of our discussion on the evaluation criteria that will guide the Corps of Engineers' review of the project.

Upon reviewing the potential regulated fills associated with the project, it appears that impacts will likely exceed nationwide general permit thresholds in some areas. The segment where Highway 16 intersects Medicine Lake National Wildlife Refuge is an example. Any individual fill in excess of 0.50 acre will exceed the threshold established in Nationwide Permit 14 for transportation crossings. If we cannot authorize the project under general permit authority, an individual permit will be required.

In order to issue an individual permit, we must conduct a project-specific analysis to determine compliance with the 404(b)(1) guidelines (40 CFR 230). The 404(b)(1) evaluation requires an alternatives analysis that identifies the least environmentally damaging practicable alternative (40 CFR 230.10(a)). Once identified, this alternative becomes the "permittable" alternative unless it is ultimately proven impracticable in light of the overall project purpose. The Corps of Engineers determines the overall project purpose. The overall project purpose must be specific enough to define the applicant's needs, but not so restrictive that it precludes a meaningful evaluation of alternatives. The overall project purpose for highway enhancement projects typically focuses on justifiable safety/capacity improvements between given endpoints of an existing corridor. If MDT ultimately submits an alternative other than the least environmentally damaging practicable alternative for a permit, denial is the likely outcome. At this stage of project review, we cannot presume the outcome of our 404(b)(1) analysis, so the preceding discussion is simply to help MDT understand our determinative criteria.

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As you will note from the preceding discussion, the alternatives analysis required to satisfy Clean Water Act requirements has some important distinctions from the analysis required for National Environmental Policy Act purposes, namely identification of the least environmentally damaging practicable alternative. If an individual permit is required, it is important for our agencies to coordinate on the purpose and need statement, the identification of alternatives carried forward for further review and selection of the preferred alternative under NEPA to ensure compatibility with CWA requirements.

If FHWA signs a NEPA categorical exclusion for this project, we would have the option of using Nationwide Permit 23 to authorize associated fills. This permit does not have a fill threshold at either the site or project level, however, as we discussed this morning, we will not use it indiscriminately to authorize large amounts of fill. I cannot give you a bright line for when Nationwide 23 becomes out of bounds. It is necessarily a judgment call based on an evaluation of the amount and type of fills associated with the project, which we cannot do until a more detailed inventory of project impacts is available.

The potential impediments to CWA permitting identified above may be resolvable through project design that minimizes impacts to jurisdictional waters. Keeping fills below the 0.50-acre threshold at each site where the highways intersect jurisdictional waters will keep the project within nationwide general permit purview.

Thank you for the opportunity to comment on this TRED study during the early phases of project evaluation. Shannon Johnson, (406) 657-5910, is the Corps' project manager for this action. Please continue to coordinate with Ms. Johnson as this effort progresses. Please call me at the above number if you have any questions regarding this letter.

Sincerely,

Allan Steinle

Allan Steinle
Montana Program Manager

CF:

CENWO-OD-RMT, Billings

Ted Burch / Carl James
Federal Highway Administration
585 Shepard Way
Helena, Montana 59601

North Dakota Department of Transportation

Francis G. Ziegler, P.E.
Director

John Hoeven
Governor

March 29, 2007

Ms. Sandy Straehl, Administrator
Rail, Transit, and Planning
Montana Department of Transportation
2701 Prospect Avenue
Helena, MT 59620-1001

NORTH DAKOTA RESPONSE TO TRANSPORTATION REGIONAL ECONOMIC DEVELOPMENT - THEODORE ROOSEVELT EXPRESSWAY STUDY

We have reviewed the November 8 Executive Summary and document regarding the TRED study. The North Dakota Department of Transportation (NDDOT) finds Montana's initiative consistent with the four lane activities of North Dakota based on system continuity, regional, and economic interconnectivity.

We do note an issue in the Executive Summary on page vi with respect to four lane continuity and regional interconnectivity. That section refers to the survey conducted on the future of the Theodore Roosevelt Expressway Corridor with respect to neighboring states and their plans for future development of the corridor. That section states that North Dakota is progressing toward four lane expansion of its portion of the Theodore Roosevelt Expressway. The statement is not consistent with the comment that NDDOT had submitted to Montana in November 2006. At that time, NDDOT stated in response to the study survey that it currently has no plans to four lane the US 85 portion of the Theodore Roosevelt Expressway. As per our phone conversations, Montana DOT has modified that section to only reflect NDDOT's interest in a possible four-lane design on the US 2 segment of the Theodore Roosevelt Expressway.

In a similar survey question with respect to future plans of US 2, NDDOT indicated that while not having current plans to four lane US 2 from the Montana border east to the junction of US 85, North Dakota would reconsider that position and advance to developing a project for a four-lane design should Montana advance to four lane US 2 at the Montana/North Dakota border.

608 East Boulevard Avenue • Bismarck, North Dakota 58505-0700
Information: (701) 328-2500 • FAX: (701) 328-0310 • TTY: (701) 328-4156 • www.dot.nd.gov

In addition to that discussion, NDDOT would like to point out that the study correctly states that transportation in the area is fairly seamless with respect to state boundaries. Based on that, when Montana DOT proceeds forward to environmental clearance for four-laning the Montana portion of US 2 on its approach to the North Dakota border, NDDOT would like to discuss the possibility of merging efforts toward advancing future phases for corridor improvement.

In closing, we state that we find it logical for Montana DOT to proceed with its initiative of pursuing justification for four-laning its portion of the Theodore Roosevelt Expressway based on regional connectivity, system connectivity and advancement of economic growth in the region. This initiative also advances the concept of the Theodore Roosevelt Expressway as a congressional high priority corridor. We also find this initiative as complementary and parallel to North Dakota's current four-laning of US 2.

TIMOTHY J. HORNER, P.E., DEPUTY DIRECTOR FOR BUSINESS SUPPORT

56/tjh/sas
cc: Francis Ziegler, Director
Grant Levi, Deputy Director for Engineering

MASTER FILE COPY

Post-it® Fax Note 7671
To Don Galligan
Co./Dept. HDR
Phone #
Fax # 208-387-7100
Date 8-26
# of pages ▶ 2
From Hal Fossum
Co. TRED - MDT
Phone # 406-444-6116
Fax #

Montana Department of Transportation
Helena, Montana 59620

:emorandum

o: Dick Turner, Chief, Multimodal Planning
Hal Fossum, Economist Planner
Jean Riley, P.E., Chief, Environmental Services

:om: Steve Platt, Archaeologist
Environmental Services

ate: July 12, 2006

Subject: **TRED Study environmental review – Montana 16 and US 2**

This memo is written to provide some cultural resource input for the above planning project. I used 1:100,000 scale BLM topographic maps, the maps provided to me by Jean Riley, and my own archaeological experience in eastern Montana to compile the following information.

Montana has been inhabited by people since the end of the Pleistocene- the last large glacial episode on this continent. People have had about 11,000 years to leave archaeological remains across Montana. In that time, they have created a lot of sites. MDT can expect there to be dozens of archaeological sites within the proposed corridor, many of them significant to our understanding of local and regional prehistory.

I would expect to see stone circle sites (tipi ring sites) along the margins of the glacial potholes between Plentywood and the Canadian line. Between Plentywood and Medicine Lake Highway 16 follows the eastern side of the Big Muddy Valley where we are likely to find multiple stone circle sites and perhaps a bison kill or two along the valley wall, depending on its steepness. Where the road crosses perennial tributaries of Big Muddy we should expect to find several buried campsites. Buried campsites can be particularly important archaeologically because cultural materials are almost always better preserved in buried rather than surface contexts.

I expect less in the way of prehistoric archaeology from Medicine Lake to Culbertson, simply based on the flatter, drier, terrain. The exception to this is within the three or four miles of the corridor north of Culbertson. There may be both stone circle sites and/or bison kills north of Culbertson in the breaks leading down toward the Yellowstone.

From Culbertson east along Highway 2 the road follows Clover Creek and then crosses Shotgun Creek, Red Bank Creek, and then Little Muddy. Again we can expect to find buried campsites in the alluvial soils along the margins of these creeks.

In addition to archaeological resources we can expect to find historic homesteads and ranches within the proposed corridor, as well as historic buildings within the towns of Plentywood, Antelope, Medicine Lake, and Culbertson.

Assiniboine and Sioux members of the Fort Peck Indian Reservation will undoubtedly have an interest in some or all of the prehistoric sites I have discussed above. They likely continue to pursue a variety of traditional uses (plant gathering, hunting, religious practice, etc...) within the corridor as well. I am also certain that the Fort Peck Tribes will have a vested interest in Montana 16 and Highway 2 expansion from an economic perspective.

Should MDT decide to pursue expansion of the Montana 16 and US 2 facilities MDT will need to proceed with a full blown cultural resource inventory, archaeological testing, and requisite consultation with the Fort Peck Tribes.

Cc: Bonnie Steg, Supervisor, Resources & Permitting

DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS, OMAHA DISTRICT
BILLINGS REGULATORY OFFICE
2602 FIRST AVENUE NORTH, ROOM 309
BILLINGS MT 59101

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Please reply to attention of:

June 26, 2006

Billings Regulatory Office
Phone (406) 657-5910
Fax (406) 657-5911

MASTER FILE COPY

RE: TRED Study
Corps File No. 200690476

Montana Department of Transportation
Attention: Ms. Jean Riley
Post Office Box 201001
Helena, Montana 59620-1001

Dear Ms. Riley:

Reference is made to your letter regarding the TRED Study for Sheridan and Richland Counties, Montana.

Under the authority of Section 404 of the Clean Water Act, Department of the Army permits are required for the discharge of fill material into waters of the United States. Waters of the United States include the area below the ordinary high water mark of stream channels and lakes or ponds connected to the tributary system, and wetlands adjacent to these waters.

Based on the information provided, the project area may contain jurisdictional waters of the U.S., which may trigger permitting requirements. It is impossible to advise you on likely permitting scenarios without detailed information pertaining to the project corridor and the scope of project impacts.

When final design has been completed, please submit plans and a joint application to this office, along with project drawings and photographs of the proposed sites. Please also include an inventory of aquatic resources, including wetlands that may be affected by this project. The application can be downloaded from http://www.nwo.usace.army.mil/html/od-rmt/applications.html, or one can be mailed to you upon request. When the application is complete, a determination will be made as to whether or not authorization will be granted.

If you have any questions, please call me at the Billings office at (406) 657-5910, and reference File No. 200690476.

Sincerely,

Shannon Johnson

Shannon Johnson
Project Manager

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Montana Fish, Wildlife & Parks

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JUN 26 2006
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June 22, 2006

1420 E. Sixth Avenue
P.O. Box 200701
Helena, Montana 59620-0701

MASTER FILE COPY

Jean Riley
Montana Department of Transportation
2701 Prospect Avenue
P.O. Box 201001
Helena, Montana 59620-1001

TRED Study
Theodore Roosevelt Expressway
Montana 16-Canada Border to Culbertson
& Culbertson to ND Border

Dear Jean:

The Montana Department of Fish, Wildlife & Parks has reviewed the information submitted regarding your study efforts along the identified corridor. Thank you for the opportunity to provide comments.

Development along rivers and streams can adversely affect or destroy the waterway or adjacent riparian areas. Current development practices can and are causing excessive and unnecessary damage to the banks, beds, and protective vegetation of the state's streams and rivers. The state has a duty to protect the integrity of its rivers and streams on behalf of all its citizens, and it is imperative that Best Management Practices be incorporated into construction plans and projects be designed to maintain and safeguard our natural aquatic and riparian habitats. To that end, the following recommendations are offered to protect these important areas.

a. Development plans should first incorporate a design that avoids direct adverse impacts to these resources. If conditions are such that direct adverse impacts cannot be avoided, project features should be designed to minimize impacts. Unavoidable adverse impacts should be mitigated.
b. Ephemeral, intermittent and perennial stream systems cross the study corridor. All efforts should be taken during pre-design through construction phases to assure uninterrupted passage of a stream's discharges to maintain the natural channel pattern, dimension and profile and temporal characteristics. These stream systems are readily observable on the maps and aerial photos provided or by a site visit.
c. Riparian areas adjacent to these drainages should also be protected to the maximum extent practicable. If such areas cannot be avoided or will be notably be degraded in scope or quality, they should be mitigated on site and in kind. This may require MDT to develop procedures that allow the re-establishment of stream systems and riparian areas outside of existing rights-of-way.

d. If crossings are necessary, bridges are preferred over culverts as bridges usually result in less adverse impact to a stream's features, functions, dynamic processes and its adjacent riparian habitat less than a culvert at the same location. Installation of culverts may or may not require site-specific mitigation. In general, culverts should be embedded and lengths minimized where feasible.
e. If not already done so, the USFWS should be notified regarding any concerns related to Medicine Lake National Wildlife Refuge.

Thank you for the opportunity to provide comments and please contact me if you have any questions.

Sincerely,

doug mcdonald

Doug McDonald
Stream Protection Coordinator
Habitat Protection Bureau/Fisheries

Copy: FWP Region 6 – Bill Wiedenheft
DEQ – Jeff Ryan
COE – Allan Steinle

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 8, MONTANA OFFICE
FEDERAL BUILDING, 10 West 15th Street, Suite 3200
HELENA, MONTANA 59626

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JUL 7 2006

Ref: 8MO

July 7, 2006

Post-it® Fax Note 7671	Date 7-7-06	# of pages ▶ 20
To Don Galligan	From Hal Fossum	
Co./Dept. HDR	Co. MDT	
Phone #	Phone # 406-444-6116	
Fax # 208-387-7100	Fax #	

Mr. Dick Turner, Chief, Multi-Modal Planning
Montana Dept. of Transportation
2701 Prospect Ave., P.O. Box 201001
Helena, MT 59620-1001

Re: EPA Comments on TRED Study Scan

Dear Mr. Turner:

The Environmental Protection Agency (EPA) Region VIII Montana Office was not able to attend the June 23, 2006 TRED Corridor Study environmental review session, however, we have received information on the TRED Study including a set of maps showing the proposed study area along Montana Highway 16 from the Canada border to the Port of Raymond to the intersection with US Highway 2 at Culbertson; and from that intersection east along US 2 to the North Dakota state line, and want to offer input in response to your request.

We have not reviewed the proposed TRED Study area in the field, and cannot at this time provide much site-specific guidance regarding environmental issues in the area, but we want to draw your attention to a document that we drafted entitled, *"Guidance/Measures to Reduce Environmental Impacts of Highway Projects"* (see copy attached). This document was drafted in association with interagency discussions for development of an improved ecosystem approach for transportation project development. It is intended to identify general environmental issues and concerns with highway projects, as well as potential mitigation measures to minimize and reduce impacts. Ms. Jean Riley, of the Montana Dept. of Transportation Environmental Services Bureau, has reviewed and offered input on this draft document. This document may be of interest and helpful in identifying environmental issues as you proceed with this TRED Corridor Study.

One of the more significant environmental issues is likely to be potential impacts to aquatic areas, including wetlands, particularly if widening of the existing roadway to four lanes is proposed. As noted in our draft *Guidance,* Clean Water Act Section 404 Dredge and Fill Permit rules and policies require that adverse impacts to aquatic resources be avoided and minimized, and only the least environmentally damaging alternative to aquatic resources may be permitted, so long as that alternative does not have significant adverse environmental consequences (40 CFR 230.10a).

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It will be important, therefore, for proposed highway improvements along Montana Highway 16 and US Highway 2 to avoid and minimize adverse impacts to aquatic resources. There may be potential concerns about development of a four lane highway in the proposed study area if aquatic areas would be adversely affected by highway expansion, and adverse effects were not justified by the project purpose and need. It is important that existing and future traffic volumes demonstrate a need for a four-lane highway to justify potential adverse impacts, and allow a Section 404 Dredge and Fill permit to be issued in conformance with regulatory requirements.

We note that when an EIS was prepared to evaluate alternative highway improvements along US Highway 2 east of Havre, Montana in 2004, it was found that the two-lane highway alternatives fulfilled the project purpose and need with fewer adverse environmental impacts than the four-lane alternatives. In addition, the two-lane alternatives were substantially less costly, and an economic analysis referenced in that EIS reported that capacity improvements to U.S. 2 were unlikely to induce development, and none of the alternatives would create substantial growth in the economy of the area. The four-lane alternatives, therefore, offered no improvement to the regions economy and potential for future growth over the improved two-lane alternatives, and would cost substantially more with greater environmental effects. These results may offer implications and guidance relevant to the proposed TRED Corridor Study.

If you have any questions or if we may provide further information regarding this project plese contact Mr. Steve Potts of my staff in Helena at (406) 457-5022 or in Missoula at (406) 329-3313 or via e-mail at potts.stephen@epa.gov . Thank you for your consideration.

Sincerely,

John F. Wardell
Director
Montana Office

Enclosure

cc: Larry Svoboda/Julia Johnson, EPA, 8EPA-N, Denver
Allan Steinle/Todd Tillinger, COE, Helena
Jean Riley, MDOT, Environmental Services Bureau

DRAFT

Guidance/Measures to Reduce Environmental Impacts of Highway Projects

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- Sediment & Erosion Control 2
- Stream/Riparian/Floodplain Encroachment 2
- Stream Crossings (Bridges and Culverts) 3
- Road Maintenance 4
- 303(d) Listed Waters & TMDLs 4
- Impacts to Waters of the U.S., including Wetlands, and Clean Water Act Section 404 Permits 5

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Superfund Sites 19

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Noise 19

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Water Quality/Aquatics

-Roadway siting, construction, operation, and maintenance can impact streams, wetlands and riparian areas due to stream/riparian/floodplain encroachment, runoff, disruption of drainage patterns, stockpiling of materials in staging areas, maintenance of construction and maintenance equipment, and snow plowing and sanding of roads or use of salt and deicers. Road projects should be planned, designed, constructed and maintained to avoid or have minimal long-term water quality impacts. Water quality protection measures should be identified in the NEPA document.

Sediment & Erosion Control

-It is important to reduce and control erosion and sediment transport during construction, and to plan and design highways to minimize pollutant loading from highway runoff through use of appropriate BMPs. Highway projects are regulated through MPDES/NPDES Permits to authorize discharge of pollutants through stormwater runoff. Such permits include the requirement to prepare a Storm Water Pollution Prevention Plan (SWPPP), which identifies BMPs for erosion control and management of stormwater runoff, and include a provision that no unnecessary operation of equipment occur within the channels of creeks and rivers to mitigate water quality impacts. http://www.deq.state.mt.us/wqinfo/MPDES/swPermits/2002ConstGenPermit/FinalConstPermit02.pdf#xml=http://search2.discoveringmontana.com/cgi-bin/texis.cgi/webinator/search/xml.txt?query=BMPs+for+highway+construction&pr=DEQ&prox=page&rorder=500&rprox=500&rdfreq=500&rwfreq=500&rlead=500&sufs=0&order=r&cq=&id=43574f6d1

Stream/Riparian/Floodplain Encroachment

-Highway planning and design should avoid/minimize highway encroachment upon, or disturbance to natural stream hydrology, stream banks and channels, riparian areas, wetlands, and floodplains. Natural stream characteristics and hydrology should be maintained and preserved, and the natural and beneficial effects of riparian areas and floodplains should be restored and/or protected.

-Stream channel modifications should be avoided. If there is absolutely no way to avoid impacts to the stream channel, channel changes should be planned and designed to

simulate natural stream channel dimensions and length, while incorporating natural aquatic habitat features (riffle, pool, run) as much as possible. It is preferable to restore channel length and natural riffle/pool sequences without installation of artificial grade control structures, although if channel length cannot be restored, grade control structures may be necessary to maintain channel stability. Aquatic biologists and staff with training and knowledge of fluvial geomorphology be consulted during design of stream channel modifications, with appropriate permits and authorizations obtained (404 permits, 401 certification, 310 or 124 permits, short-term turbidity exemptions, tribal permits, etc.,).

Stream Crossings (Bridges and Culverts)

-Replace or widen existing bridges wherever possible; incorporate wildlife crossing features for passage underneath the roadway while minimizing impacts on streams and wetlands; design culverts to accommodate flood flows and enhance fish passage; replacing culverts with bridges where possible; adding culverts to improve hydrologic connections and reduce potential for flooding; and removing and restoring existing roadways where a new roadway corridor is created.

-Assure that the bridge and culvert designs accommodate flood flows with no substantial changes to flood elevations. Bridges should have adequate size, configuration and span to reduce floodplain encroachment (e.g., construction of bridges on pilings, as opposed to fill, can reduce encroachment), and should match hydraulic traits of the natural stream, while minimizing disturbance to stream hydrology, banks and channel, and encroachment upon the river channel, riparian area, and floodplain. Stream crossings should be able to pass flood flows and bedload, maintaining the integrity and continuity of the floodplain as well as the actual channel to avoid impeding flood flows that could cause sediment deposition above stream crossings and erosion and scouring below crossings. Culverts should simulate the natural stream grade and stream bed substrate as much as possible (open bottom arch culverts to provide a natural streambed preferred), and have sufficient width and capacity to pass flood flows and bedload transport with minimal encroachment upon the river channel and riparian area. Bridges with wide spans also afford opportunities for wildlife passage, and reduce wildlife-vehicle collisions.

- Stream crossings should provide for fish passage, http://www.hsus.org/wildlife/issues_facing_wildlife/wildlife_crossings_wild_animals_and_roads/

-Stream crossing construction work should be conducted during periods of low stream flow to avoid spawning and incubation periods for important fish, and should avoid and/or minimize impacts on the stream channel during construction. Special care should be taken to avoid or minimize impacts to riparian vegetation and avoid riparian degradation and siltation of the creek as much as possible during construction, with restoration and revegetation of disturbed stream banks and riparian areas following construction.

Road Maintenance

-Maintenance activities such as application of herbicides, mowing, and winter maintenance such as snowplowing and application of sand, salt, and chemical deicers have the potential to introduce sediment, materials and chemicals either directly or indirectly to a stream and associated riparian and wetland resources. Maintenance operations should be conducted in a manner that minimizes adverse impacts to streams and wetlands. Practices of expediently sidecasting material over the shoulder, filling depressions and widening shoulders can have adverse effects upon streams, wetlands, and riparian areas, and are inappropriate. Snow plowing and subsequent to sanding moves sand off the roadbed to the adjacent ditch line and fill slopes, filling depressions and ditches and widening shoulders, which can have adverse effects upon streams, wetlands, and riparian areas. Impacts of winter maintenance activities are more a matter of a long term indirect and cumulative effects than any one incident.

-BMPs for maintenance operations should be used such as using mechanical brooms to pick up sand; using sediment traps, straw bales, silt fences, and vegetative filters near streams and wetlands to capture sediment before it can enter streams and wetlands; reuse of sanding material; etc,.

-Training available for road maintenance crews regarding conduct of road maintenance in a manner that protects streams and wetlands (contact, Montana Local/Tribal Technical Assistance Program at Montana State University, Steven J. Jenkins, P.E, at 406-994-6100 or 1-800-541-6671).

-When winter highway maintenance activities potentially affect streams and wetlands the effects of the maintenance program should be disclosed in the NEPA document, including measures to mitigate effects on waters of the United States (mitigation means avoid and minimize adverse effects, and compensation for unavoidable effects).

303(d) Listed Waters & TMDLs

-Highway improvements should not further degrade water quality impaired waters listed by the Montana DEQ under Section 303(d) of the Clean Water Act, and should be consistent with Total Maximum Daily Loads (TMDLs) and Water Quality Restoration Plans (WQRPs) prepared to restore beneficial use support for impaired waters. If additional pollutant loading is predicted to occur to a 303(d) listed stream as a result of a highway project, the project should include measures to control existing sources of pollution to offset pollutant addition from road construction, so that no worsening of water quality occurs.
-MDT/FHWA should contact the Montana Department of Environmental Quality to ensure MDEQ concurrence on, and coordination of proposed activities with the MDEQ's TMDL development for impaired 303(d) listed water bodies. MDT/FHWA should work

with the MDEQ as it develops Total Maximum Daily Loads (TMDLs) and associated water quality restoration plans for 303(d) listed streams in the project area to seek opportunities for water quality restoration (e.g., contact Robert Ray at 444-5319, Jeff Ryan at 444-4626, Mark Kelley at 444-3508). On Tribal lands, contact the Tribe's environmental office to identify impaired water bodies and any applicable TMDL/Water Quality Restoration Plans (e.g., on Flathead Reservation contact Paula Webster at 406-883-2888).

-Where appropriate consider conduct of watershed or aquatic habitat restoration activities to compensate for past impacts of highways to aquatic resources, particularly in watersheds with 303(d) listed waters where highways may have contributed to aquatic impairments through past channelization, riverine or floodplain encroachments, sediment delivery during construction, continuing maintenance activities, and other activities that may have affected channel stability, water quality, aquatic habitat, and designated waterbody uses.

Impacts to Waters of the U.S.; including Wetlands, and Clean Water Act Section 404 Permits

-Project planning and design should avoid and minimize impacts to waters of the U.S., including wetlands, as much as possible, and the NEPA document should discuss planning and design measures to avoid and minimize impacts to wetlands (i.e., include draft 404(b)(1) analysis in the NEPA document). Clean Water Act Section 404 Dredge and Fill Permit rules and policies for placement of fill material in waters of the U.S., including wetlands, should be followed. These rules require that adverse impacts to aquatic resources be avoided and minimized as much as possible, and that only the least damaging practicable alternative to aquatic resources be permitted, so long as that alternative does not have other significant adverse environmental consequences (40 CFR 230.10(a)).

-Project purpose and need should be concurred upon by the Corps of Engineers and other agencies involved in the 404 regulatory process. Highway project purpose and need should be demonstrated from a traffic and volume standpoint to avoid unnecessary impacts to aquatic resources.

-Identify impacts to wetlands with acreages and impacts to wetlands functions, including direct and indirect impacts (i.e., unavoidable impacts from road construction, including gravel mining or excavation of borrow material, stockpiling of materials in staging areas and disposal of waste materials; reasonably foreseeable impacts from induced growth; etc,). MDT should oversee the construction contractor to assure that environmentally sensitive areas are avoided when obtaining material sources and during excavation/fill operations. Unavoidable impacts to wetlands or other aquatic areas during project construction (from material source sites or other reasons) need to be authorized through 404 permits.

-Plan wetland mitigation to compensate for unavoidable wetland losses. The goal of wetland mitigation should be to replace the functions of lost wetlands in areas adjacent to or as close as possible to the area of wetlands loss. EPA/Corps policy has accepted acre-for-acre replacement of wetlands as a surrogate for replacement of functions when there is a lack of definitive information on functions, although adjustments may be necessary to reflect the expected degree of success of mitigation, and provide an adequate margin of safety (i.e., greater than acre-for-acre replacement is suggested when impacted wetlands have high function and likelihood of replacement is low). Mitigation should look at on-site compensation first, then off-site; in-kind then out-of-kind.

-Prepare detailed Wetland Mitigation Plan providing for adequate replacement of lost wetland functions when a final preferred alternative is identified. This Plan should be approved by the appropriate agencies before implementation of the proposed project. If land acquisition for wetland mitigation is needed, we encourage negotiations for such acquisition concurrent with negotiations for acquisition of acquisition of road right of ways. The Wetland Mitigation Plan should contain a statement of goals, a monitoring plan, long-term management/protection objectives and a commitment to conduct additional work, if required, to meet the goals of the Plan. A summary or outline of the Wetland Mitigation Plan should be included in the FEIS (as an appendix), and we encourage consultation with the Montana Interagency Highway Wetlands Group for wetland mitigation efforts to facilitate interagency agreement on the proposed mitigation plan for replacement of wetland functions. We note that excavation of borrow material to meet construction needs may provide an opportunity for wetland mitigation (i.e., wetland creation).

-The Army Corps of Engineers, U.S. Fish & Wildlife Service, EPA, Montana Dept. of Fish, Wildlife and Parks and Montana Dept. of Environmental Quality and appropriate Tribal authorities should all be contacted to assure that proper authorizations and permits are obtained prior to construction (e.g., 404 permits, 310 or 124 permits, short term turbidity exemptions, tribal permits, etc.,). We suggest contacting Todd Tillinger of the Corps of Engineers in Helena at 406-441-1375; Jeff Ryan of the MDEQ at 406-444-4626; and Scott Jackson of the USFWS in Helena at 406-449-5225, and Toney Ott of EPA at 303-312-6909. Many Tribes have local ordinances designed to protect water quality (e.g., Aquatic Lands Conservation and Shoreline Protection Ordinances and on the Flathead Reservation, http://www.cskt.org/tr/nrd.htm). Tribal governments should be contacted to obtain necessary Tribal permits (on the Flathead Reservation call the Natural Resources Department at 406-883-2888).

Wildlife

-The quality and capacity of wildlife habitat, known wildlife corridors/trails, and usage by wildlife near proposed highway projects should be evaluated. Direct and indirect (e.g., induced growth, noise, etc.,) effects of new highway alignments or widening of existing roads upon wildlife should be evaluated (including increased mortality from higher traffic levels, loss of habitat, reduced access to available habitat, blockage of

migration and travel corridors, effects on biodiversity). Existing wildlife mortality and wildlife-vehicle accident history should be evaluated to show where there is a need to develop additional road improvements to deter wildlife crossing and/or decrease wildlife-vehicle collisions, and focus the location of additional design measures to reduce risks of animal-vehicle collisions. Wider highways, particularly a divided four-lane highway, will have a wider crossing distance for terrestrial wildlife to contend with, and will likely be a greater barrier to species movement across the highway, increasing wildlife fragmentation and reducing wildlife connectivity. Such effects should be minimized, and unavoidable effects to wildlife mitigated as much as possible.

-Mitigation measures should be incorporated into the project to reduce impacts to wildlife habitat, and connectivity/fragmentation impacts, and risks of vehicle-wild animal crashes. Estimated reductions in impacts to wildlife from proposed mitigation should be disclosed. Increased sight distance with clear zone improvements help drivers avoid crossing wildlife and may decrease animal related accidents. Wildlife is often attracted to and follow drainages, so bridge structures for wildlife passage should be considered in areas where there is high wildlife use and history of animal-vehicle collisions. The mitigation sections should include analysis of the extent to which stream crossings can be modified to also serve as wildlife crossings to reduce wildlife mortality, connect habitat areas, and reduce traffic accidents (assuming stream crossings coincide with areas where there is wildlife movement or an opportunity to reduce mortality rates). Use replacement or modification of existing or proposed bridges as opportunities to include design provisions to facilitate safer wildlife crossing and reduce wildlife-vehicle accidents (e.g., assuring that bridges are wide enough to span upland area as well as wetted areas to enable movement for terrestrial wildlife species). Crossings should be of sufficient width, contain minimal dark passages, and consider use of wing guide fencing in appropriate locations to help direct wildlife to safer crossings of the highway. Information regarding wildlife and highway conflicts and mitigation may be available on websites, for example: http://www.fhwa.dot.gov/environment/wildlifecrossings/overview.htm ; www.berrymaninstitute.org ; http://www.hsus.org/wildlife/issues_facing_wildlife/wildlife_crossings_wild_animals_and_roads/ ;

Threatened and Endangered Species

- If the proposed activities could affect threatened or endangered species (e.g., bull trout, grizzly bear, bald eagle, lynx, gray wolf, etc,), the NEPA document should include the Biological Assessment and the associated U.S. Fish and Wildlife Service (FWS) Biological Opinion or formal concurrence for the following reasons:

(1) NEPA requires public involvement and full disclosure of all issues upon which a decision is to be made;
(2) The CEQ Regulations for Implementing the Procedural Provisions of NEPA strongly encourage the integration of NEPA requirements with other

environmental review and consultation requirements so that all such procedures run concurrently rather than consecutively (40 CFR 1500.2(c) and 1502.25); and

(3) The Endangered Species Act (ESA) consultation process can result in the identification of reasonable and prudent alternatives to preclude jeopardy, and mandated reasonable and prudent measures to reduce incidental take. These can affect project implementation.

-Both the Biological Assessment and the EIS must disclose and evaluate the potential impacts of the proposed action on listed species. They can jointly assist in analyzing the effectiveness of alternatives and mitigation measures. The full disclosure mandate of NEPA suggests that consultation be instigated as soon as possible. Thus, the final EIS and Record of Decision should not be completed prior to the completion of ESA consultation. Treating the consultation process as a separate parallel process that is not closely involved with the NEPA process represents a risk because during the consultation, FWS could identify additional impacts, new mitigation measures, or changes to the preferred alternative. If these changes have not been evaluated in the final EIS, a supplement to the EIS could be warranted.

Biodiversity

-Biodiversity may be a critical consideration for new projects, major construction or when special habitats (i.e., wetlands, springs, fens, threatened and endangered species habitat) will be affected. The state of the art for this issue is changing rapidly. CEQ prepared guidance entitled, "Incorporating Biodiversity Considerations Into Environmental Impact Analysis Under the National Environmental Policy Act,". http://www.eh.doe.gov/nepa/tools/guidance/Guidance-PDFs/iii-9.pdf

Indirect Effects/Quality of Life/Smart Growth

-CEQ's regulations for implementing NEPA state that an EIS should include disclosure of: "Indirect effects and their significance (40 CFR 1502.16(b))." Indirect effects are defined as "...caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable. Indirect effects may include **growth-inducing effects related to induced changes in the pattern of land use, population density or growth rate, and related effects on air and water and other natural systems, including ecosystems.**" (40 CFR 1508.9(b))

--New highway construction that improves traffic flow and eliminates congestion can increase access and contribute to induced residential, commercial, industrial growth, and changed land uses. Increased rates of growth and land use changes caused by a highway project, constitute indirect effects that should be evaluated. Induced residential, commercial, and industrial growth and land use change affect air quality, water quality, wetlands, wildlife habitat loss and fragmentation, urban sprawl, loss of rural character, farm land, ecosystems, and other natural resources. Road building and expansion often

result in induced growth effects (sprawl), and stimulate increased use of privately owned vehicles and vehicle miles traveled. This, in turn, leads to increased auto dependency and demand for more roads. These types of indirect effects and appropriate mitigation measures need to evaluated and disclosed in the EIS (i.e., identify existing condition and trends and forces shaping growth and development in the area; identify land with development potential and most likely locations of growth; identify sensitive environmental resources that may be impacted; estimate growth and impacts with and without project).

-CEQ regulations also state that an EIS should include the "means to mitigate adverse environmental effects." (40 CFR 1502.16(h)) This provision applies to indirect effects as well as direct effects. Since the CEQ regulations require an analysis of indirect effects, the best time to identify such effects is prior to impacts, when there is better opportunity to avoid, minimize or mitigate for them. Much of the mitigation for indirect effects is subject to regulation by the city/county in which the highway will be constructed. If analysis of indirect induced growth effects occurs before the highway project is completed, the city/county will be in a better position to effectively plan for future growth and develop mitigation measures for the impacts resulting from induced growth. The EIS should serve the function of offering the city/county adequate notice of the foreseeable environmental consequences, thus providing the opportunity to plan and implement corrective measures, if needed, in a timely manner.

-The EIS can identify potential mitigation techniques for induced growth and associated environmental effects, such as:

-access controls (location of interchanges)
-context sensitive designs
-local land use plans that affect or regulate new development
-zoning controls
-transfer of development rights
-growth management regulation (public facilities ordinances, development moratoria, urban growth boundaries, extraterritorial zoning/annexation)
-resource management and preservation regulations
-land acquisition and conservation easements
-incentives for Brownfields/infill development
-development fees and exactions.
-Analysis of indirect effects should not rely solely on compliance with existing comprehensive land use plans. While comprehensive land use plans are an important component of the analysis of indirect effects, compliance with these plans could still result in adverse environmental effects.

Smart Growth

Encourage planners and decision makers to consider effects of infrastructure

development, including transportation improvements, on growth patterns, and to plan and coordinate infrastructure improvements with land use planning to direct growth to desired areas, and away from environmentally sensitive areas. Sustainable solutions to transportation problems are more likely to be realized by focusing on longer-term approaches that provide increased transportation choices (multi-modal mobility), that bring people to the activities or the activities to the people (accessibility), that foster community vitality, environmental justice, and quality of life (livability), and that meet our social, economic, and ecological needs without compromising the ability of future generations of all species to do likewise (sustainability). Planners and decision makers should consider opportunities to reduce transportation demand, and where demand exists, address the real and underlying transportation need: to move people and goods not necessarily cars.
http://www.fhwa.dot.gov/planning/sgindex.htm
http://www.epa.gov/smartgrowth/

-Provide analytical support for community-generated ideas, and explore multi-faceted solutions. It may be possible to combine several ideas/alternatives that, collectively, will address the project need. A package of alternatives could include alternative transportation modes, trip reduction, land use adjustments, parking controls, pricing mechanisms, other incentives and/or disincentives, new route design or traffic circulation patterns, and more.

-Transportation demand management should be evaluated. Include transportation demand management (trip reduction) and transportation system management (TDM and TSM) in all projects and alternatives, with the greater emphasis upon TDM. An array of travel alternatives, roadway use options such as carpool lanes, financial incentives, work hours and location management options exist, and more ideas are being generated. Land use strategies, such as mixed use and transit oriented development, also serve to curb travel demand.

-Maximize the use of existing infrastructure. Prevent further habitat degradation, fragmentation, and loss by making better use of existing transportation infrastructure. For example, emphasize use of existing rights-of-way, improving existing rail lines, roads, and trails, and better integrate existing transportation infrastructure with land use planning. Actions such as re-striping pavement to provide bike lanes, peak hour lane conversion for high occupancy vehicles (HOV), and transit priority/preference techniques such as traffic signal override and synchronization, are easy, inexpensive innovations that can make a difference in traffic flow and livability.

-Consider redevelopment. Redevelopment prevents sprawl and protects farms, forests, and natural lands by making better use of existing developed areas and urban space. It can also exert a positive influence on the surrounding community. Businesses thrive when they are located in attractive settings that are accessible to pedestrians, bicyclists, and public transportation; communities develop when people get out of their cars; and the

amenities provided by the natural environment, farmlands, and rural areas remain intact.

Cumulative Effects

-NEPA requires that cumulative impacts be addressed as a summary of the individual impacts of this and all other past, present, and "reasonably foreseeable" future plans and actions, regardless of what agency (Federal or non-Federal) or person undertakes such actions. This should include identification of all the direct and indirect effects that are known, and a good faith effort to explain the effects that are not known but are reasonably foreseeable.

-In January 1997 the President's Council on Environmental Quality (CEQ) published, "*Considering Cumulative Effects Under the National Environmental Policy Act*", guidance that provides a framework for analyzing cumulative effects http://ceq.eh.doe.gov/nepa/ccenepa/ccenepa.htm. In May 1997 EPA published a document entitled, "*Consideration of Cumulative Effects in EPA Review of NEPA Documents.*" This document can be found at, http://www.epa.gov/compliance/resources/policies/nepa/cumulative.pdf . The California DOT also has developed good guidance for cumulative effects analysis, http://www.dot.ca.gov/ser/cumulative_guidance/purpose.htm.

The cumulative effects analysis should:

1) Identify the area in which effects of the proposed project will be felt and existing conditions and trends.

2) Determine resources within the project impact area that could be affected by the highway project, particularly the resources most likely to be significantly impacted and the geographic areas in which those resources are located; and the condition of such resources (i.e., the extent to which they are degraded). Use appropriate analysis area boundaries for the resource and time period over which the cumulative effects have occurred or will occur. In most cases, the largest of these areas will be the appropriate area for analysis of cumulative effects. The selection of geographic boundaries should be, whenever possible, based on the natural boundaries of resources of concern (e.g., watershed boundary for water quality issues). The temporal scope requires estimating the length of time that effects of the proposed action singly or in combination with other anticipated actions will last and be significant to the resources of concern. The period of time that the proposed action's impacts persist can extend beyond the project life. The analysis should extend until the resources have recovered from the impact of the proposed action.

3) Identify impacts that are expected to resources of concern from the proposed project through analysis of cause-and-effects relationships. Knowing how a particular resource responds to environmental change (cause-and-effect relationship) is essential for

determining the cumulative effects of multiple actions. Cause-and-effect pathways should be identified to understand how the resources respond to environmental change (i.e., what the effect is). The cause-and-effect relationships for each resource should be understood to determine the magnitude of the cumulative effect resulting from all actions included in the analysis.

4) Identify other actions -past, present, and reasonably foreseeable future actions- that have had or are expected to have impacts in the same area, and the impact or expected impacts from these other actions. Even unrelated actions conducted on by other agencies or persons on all land ownerships, if they contribute to cumulative effects on a resource, should be incorporated into the analysis. A common inadequacy of documents is the lack of analysis or disclosure of the sum of individual effects of all projects on the local environment. A summary listing of other projects occurring in the vicinity without the accompanying analysis is insufficient. The identification of the effects of past actions is critical to understanding the environmental condition of the area. The EIS should consider how past and present activities have historically affected and continue to affect the resources, ecosystems, and communities of concern. Linked Developments - If the construction of a new road or reconstruction of an existing road will likely facilitate or cause additional developments, the effects of these linked impacts must also be analyzed. The concept of a baseline or environmental reference condition against which to compare predictions of the effects of proposed actions and reasonable alternatives is critical to the NEPA process. The baseline condition of the resource of concern should include a description of how conditions have changed over time and how they are likely to change in the future with and without the proposed action.

It is also important to incorporate future actions of agencies and the public into cumulative impact analyses. Good cumulative effects analysis requires close coordination among agencies and the public to ensure that all past, present and reasonably foreseeable future actions are considered. Reasonably foreseeable future actions need to be considered even if they are not specific proposals. The criterion for excluding future actions from analysis whether they are "speculative." In general future actions can be excluded from the analysis of cumulative effects if: a) the action is outside the geographic boundaries or time frame established for the cumulative effects analysis; b) the action will not affect resources of concern that are the subject of the cumulative effects analysis; and c) including the action would be arbitrary.

5) Determine the overall cumulative impacts that can be expected if the individual impacts are allowed to accumulate, and provide comparisons of cumulative impacts for the proposed actions and the reasonable alternatives in relation to the no action alternative and/or an environmental reference point. The analyses should provide a clear basis for choice among options by the decision maker and the public.

6)Identify mitigation measures where appropriate to reduce adverse cumulative effects. Monitoring should be put in place to evaluate predictions and mitigation effectiveness.

Air Quality

-Impacts of highway alternatives on air quality must be analyzed and disclosed, and quantified where possible. Existing air quality and meteorological monitoring data should be presented, as well as needed data gathering to adequately perform air quality analysis and any monitoring proposed. The primary issue of concern is motor vehicle emissions on air quality and their impact on 1) non-attainment areas; 2) Class I areas; and 3) areas where an air quality standard could be violated by increases in emissions due to increased motor vehicle use facilitated by completion of the project or the impact of not building a highway or transit project.

-The air quality analysis must demonstrate that the proposed alternative would not cause or contribute to any violations of the National Ambient Air Quality Standards, that it will not cause the air quality to degrade by more than any applicable PSD (Prevention of Significant Deterioration) increment, and that it will not cause or contribute to visibility impairment.

- Whether or not the project causes a violation of the NAAQS a thorough analysis of the impacts must be completed for the purpose of informing the public about environmental and health impacts and for use as a decision making tool.

-The following discussion presents the general criteria by which an EIS dealing with mobile sources is evaluated for air quality impacts. This discussion presents the areas to be considered rather than the details of the analysis.

1) A description of the existing air quality should be presented, including the study areas designation of attainment or non-attainment of National Ambient Air Quality Standards (NAAQS). Particular attention should be given to any areas along the corridor where people live near the highway (within 1000 feet) or where schools, hospitals, or elderly care facilities are near the facility. Residents and sensitive populations may be adversely impacted now or in the future and this should be discussed or the absence of these conditions should be noted.

2) A localized analysis of pollutants particularly carbon monoxide (CO) and PM-10 is required. For CO the eight-hour standard of 9 ppm is the controlling standard. However, it is useful to provide both one-hour and eight-hour concentrations. This analysis is required and should be proportional to the scope of the project. Until an EPA approved PM10 hotspot method is approved, a qualitative assessment for PM10 hotspots is acceptable.

3) Areawide analysis should be done for CO, PM_{10} (emissions and particulates made airborne from automobile use), and Volatile Organic Compounds as well as any other criteria pollutants or hazardous pollutants which may be affected by the

project. This analysis may not be necessary if the project is included in the State Implementation Plan (SIP) emission inventory.

4) The analysis should include a comparison of the "No Build" and all Build alternatives for existing conditions, worst case conditions, and the design years.

5) The traffic analysis should show the project's impact on average daily traffic, VMT, and speeds. The assumed population growth used to project traffic volumes should be identified to assure consistency with the population projections in the SIP.

6) Construction impacts and appropriate control measures to be taken should be discussed.

7) Monitoring should be conducted at areas of maximum concentration to which the public may be exposed. Air quality monitoring should be discussed with appropriate State, Tribal and/or EPA air quality staff (40 CFR Part 58 provides monitoring guidance).

8) An appropriate model should be used, based on the project scope. MOBILE 6.2 is the most recent mobile source emission factor model released by EPA.

9) A determination of whether the project conforms to the State Implementation Plan is required in Section 176(c) of the Clean Air Act (as amended November 15, 1991).

10) An assessment of mobile source air toxics (MSATs) must be included. Each project must be considered individually regarding the level of MSAT analysis. But in general a discussion of MSATs, their probably health effects, the quantitative (or in some cases qualitative) emission trends, likely receptors (nearby homes, businesses, schools), and sensitive populations impacted by MSATs (schools, hospitals, elder care facilities) near the proposed facilities. For many projects in Montana, the impact of MSATs will be negligible since receptors must be within 1000 feet to have an impact, this can be noted as a reason for a minimal assessment of MSAT impacts.

Section 176(c) of the Clean Air Act

-The analysis must describe any state or local air quality regulations or State Implementation Plan (SIP) requirements covering specific activities occurring as part of the project construction and/or implementation, and how compliance with those regulations or requirements will be achieved.

-The conformity provisions of the Section 176(c) of the Clean Air Act requires that all

federal actions conform to existing State Implementation Plans (SIP's), and prohibits federal agencies from taking any action that causes or contributes to a new violation of the NAAQS, increases the frequency or severity of an existing violation, or delays the timely attainment of a standard. Under section 176(c), the federal agency responsible for a proposed action is required to determine if its action will conform to the applicable SIP before the final EIS is completed. The final rule on the conformity provision can be found in 40 CFR Parts 51 and 93.

-If you have questions regarding air quality analysis please contact Mr. Jeffrey Kimes at EPA's Denver Office at 303-312-6445. Bob Habeck of MDEQ at 444-7305 is a Montana DEQ contact on Clean Air Act issues; and Betsy Wahl of EPA (Helena) at 457-5013 is an EPA Montana Office contact for Clean Air Act issues.

Weed Management

-Noxious weeds tend to gain a foothold where there are ground disturbances such as construction. The potential for spread of noxious weeds during road construction should be evaluated, and weed spread avoided/minimized with development of a weed management program that includes measures to prevent and control weed invasion. Disturbed areas should be revegetated (reseed with native grass mix), and where no native, rapid cover seed source exists, we recommend using a grass mixture that does not include aggressive grasses such as smooth brome, thereby allowing native species to eventually prevail. Mr. Phil Johnson, Botanist, Montana Dept. of Transportation, in Helena at 406-444-7657, may be able to provide guidance on revegetation with native grasses.

-We encourage prioritization of management techniques that focus on non-chemical weed control first, with reliance on chemicals being the last resort, since weed control chemicals can be toxic and have the potential to be transported to surface or ground water following application. Early recognition and control of new infestations is encouraged to stop the spread of the infestation and avoid wider future use of herbicides, which could correspondingly have more adverse impacts on water quality, fisheries, and biodiversity

-It is important that the water contamination concerns of herbicide usage be fully evaluated and mitigated. All efforts should be made to avoid movement or transport of herbicides into surface waters that could adversely affect fisheries or other water uses. Herbicides, pesticides, and other toxicants and chemicals must be used in a safe manner in accordance with Federal label instructions and restrictions that allow protection and maintenance of water quality standards and ecological integrity, and avoid public health and safety problems.

-Herbicide applicators should be advised of the potential for runoff of herbicides at toxic concentrations into the streams. The applicators should take precautions during spraying (e.g., applying herbicide only after careful review of weather reports to ensure minimal

likelihood of rainfall within 24 hours of spraying; special precautions adjacent to the stream to reduce runoff potential; etc.). It should be unequivocally stated that no herbicide spraying will occur in streams and wetlands or other aquatic areas (seeps, springs, etc.,). Herbicide drift into streams and wetlands could adversely affect aquatic life and wetland functions such as food chain support and habitat for wetland species. Streams and wetlands in any area to be sprayed should be identified and flagged on the ground to assure that herbicide applicators are aware of the location of wetlands, and thus, can avoid spraying in or near wetlands.

Plant seeds can be carried from a source area by the wind, wildlife, livestock, pack animals, or on equipment tires and tracks, by water, and on the boots of construction workers. Care should be taken to implement control procedures to avoid weed spread. Measures for preventing spread from source areas to uninfested areas include:

- Ensure that equipment tracks and tires are cleaned prior to transportation to an uninfested site.
- Focus control efforts on transportation corridors to prevent tracking of seed into uninfested areas.
- Attempt to control the spread from one watershed to another to reduce water as a transport vector.
- If a localized infestation exists and control is not a viable option, consider rerouting roads around the infestation to reduce available vectors for spread.
- Establish an education program for industrial and recreational users and encourage voluntary assistance in both prevention and control activities.
- Reseed disturbed sites as soon as possible following disturbance.

http://ceq.eh.doe.gov/nepa/regs/eos/eo13112.html

Sole Source Aquifers

Direct and indirect effects of highway projects to sole source aquifers should be evaluated and disclosed (such as the Missoula Valley Aquifer, which is the only sole source aquifer currently designated in Montana under the Safe Drinking Water Act). No commitment for Federal financial assistance may be entered into for any project that EPA determines may contaminate a designated sole source aquifer through a recharge zone so as to create a significant hazard to public health. See
http://ceq.eh.doe.gov/nepa/regs/sdwa.html
http://www.co.missoula.mt.us/wq/

EPA, MDEQ and Missoula Valley Water Quality District requirements may be necessary to assure protection of the Missoula Valley Sole Source Aquifer. There may some trade-offs in considering appropriate BMPs for management and treatment of stormwater runoff in regard to whether pollutants are delivered to surface waters or ground water. For example, use of revegetated swales to manage runoff may be more protective of groundwater, but may not reduce pollutant delivery to surface waters as well as dry wells. Also, there are some filter type BMP's which are fairly good at removing pollutants, but

have more intensive maintenance needs. We encourage review and evaluation of such trade-offs as stormwater runoff BMPs are evaluated. There is a need to prevent degradation of both the Missoula Valley Sole Source Aquifer as well as surface waters.

Diversion of runoff to the floodplain and use of dry wells (or infiltration trenches) may be potential mitigation methods to manage stormwater runoff to reduce effects to the Missoula Valley Sole Source Aquifer. The floodplain can act as a grassed infiltration basin as long as the floodplain will hold the runoff until it can slowly infiltrate to groundwater and avoid being directed into nearby surface water bodies. If this mitigation method were to be utilized, and because the risk of groundwater contamination increases in very coarse soil types, the EPA would recommend that a detailed analysis of the soil type and the depth to the Missoula Valley Aquifer in the floodplain area be determined. Dry wells can also be an effective way to remove contaminants from stormwater runoff; however, if this mitigation method were used then the EPA would recommend that a regular dry well inspection and maintenance schedule and groundwater monitoring be performed.

Some websites that provide information on stormwater BMPS include, http://www.cabmphandbooks.com/ and http://www.dot.ca.gov/hq/env/stormwater/special/newsetup/_pdfs/new_technology/CTSW-RT-01-050.pdf.

Wild & Scenic Rivers

-Direct and Indirect effects of highway projects to designated wild & scenic rivers should be evaluated and disclosed, and efforts should be made to avoid and minimize adverse effects to wild & scenic rivers as much as possible.
http://ceq.eh.doe.gov/nepa/regs/scenicrivers.html

Farmland

-Direct and indirect effects to prime or unique farmland and farmland of statewide importance should be evaluated and disclosed, and efforts should be made to avoid and minimize adverse effects to such farmland as much as possible.
http://www.eh.doe.gov/nepa/tools/guidance/Guidance-PDFs/iii-3-1.pdf
http://ceq.eh.doe.gov/nepa/regs/exec81180.html

Historic Sites

-Direct and indirect effects to historic/archaeological/cultural resources should be evaluated and disclosed, and efforts should be made to avoid/minimize adverse effects to historic/archaeological/cultural resources as much as possible. The State Historic Preservation Officer and appropriate Tribal Cultural Resources staff should be consulted.
http://environment.fhwa.dot.gov/histpres/index.htm

Section 4(f) Sites

-Direct and indirect effects to Section 4(f) properties should be evaluated and disclosed (this includes any significant publicly owned public park, recreation area, or wildlife and waterfowl refuge and any land from an historic site of national, state or local significance), and feasible and prudent alternatives should be evaluated to minimize harm to such properties. See http://environment.fhwa.dot.gov/projdev/4fpolicy.htm . An FHWA Memorandum that discusses constructive use of Section 4(f) lands is available at http://environment.fhwa.dot.gov/guidebook/vol2/doc15i.pdf .

Underground Storage Tanks

-If the highway project may impact underground storage tanks along the project corridor, contact Ms. Andreas Hochhalter of the Montana Dept. of Environmental Quality in Helena at 406-444-1416 for further information regarding requirements relative to road construction work impacts on underground storage tanks.

Superfund Sites

-If highway projects will encroach upon sites on the State Superfund list (Montana Comprehensive Environmental Cleanup and Responsibility Act, CECRA) we suggest that you contact Ms. Denise Martin of the Montana Dept. of Environmental Quality in Helena at 406-444-5060 for further information, and contact Mr. John Wardell of EPA in Helena at 406-457-5001 regarding potential impacts on CERCLA Federal Superfund sites..

Lead-Based Paint

-If a bridge painted with lead-based paint is going to be torn down and replaced, identify if the existing bridge will be refurbished with lead based paint removed. If lead based paint stays on the steel girders the girders may be disposed of as scrap metal (i.e., there is an exemption for construction debris coated with lead based paints). However, if the old lead based paint is to be removed from the bridge via scraping or sandblasting, the scraping or sandblasting residue will have to be characterized to determine if it is a regulated hazardous waste (most likely with Toxicity Characteristics Leaching Procedures or TCLP). Bridge construction techniques that capture sandblasting residue may be needed. Contact Mr. Bob Reinke of the Montana Dept. of Environmental Quality in Helena at 406-444-1435 for further information on hazardous waste identification and disposal requirements. Mr. Bruce Cooper of EPA in Denver at (303) 312-6028 is an EPA contact on lead toxicity issues. Also, OHSA requirements for worker protection should be followed.

Asbestos

-If the highway project may impact abandoned commercial, agriculture and residential structures within the project area that may contain asbestos, contact Mr. John Podolinsky of the Montana Dept. of Environmental Quality in Helena at 406-444-2690 for further information on any requirements for road construction work that may impact structures that may contain asbestos. Mr. Robert Vick of EPA in Denver is a contact for asbestos toxicity issues at (303) 321-6204.

Noise

-Direct and indirect noise effects should be evaluated and disclosed, and efforts should be made to avoid and minimize noise effects as much as possible. http://www.fhwa.dot.gov/environment/noise/

Environmental Justice

-Executive Order 12898, "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations," requires that Federal agencies make environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health and environmental effects of its programs, policies, and activities on minority populations and low-income populations. The Executive Order makes clear that its provisions apply fully to Native Americans. Avoid disproportionately high and adverse human health and environmental effect on minority or low income populations. CEQ guidance for incorporating environmental justice considerations under NEPA are shown at this website http://ceq.eh.doe.gov/nepa/regs/ej/justice.pdf ; and FHWA environmental justice guidance is available at, http://www.fhwa.dot.gov/environment/ej2.htm .

Pollution Prevention

Pollution Prevention, also known as "source reduction," is any practice which reduces, eliminates, or prevents pollution at its source. By reducing the total amount of pollution that is produced, there is less waste to control, treat, or dispose of, and there are less hazards posed to public health and the environment. As Benjamin Franklin once said, "an ounce of prevention is worth a pound of cure." We raise the pollution prevention issue here in a general manner to simply note that there is a national policy directed at reduction of pollution, recycling, and conservation of resources. Under Section 6602(b) of the Pollution Prevention Act of 1990, Congress established a national policy that organizes preferences for pollution prevention:

- Pollution should be **prevented** or **reduced** at the source whenever feasible (i.e. increase

efficiency in use of raw materials, energy, water, etc.);
- Pollution that cannot be prevented should be **recycled** in an environmentally safe manner whenever feasible;
- Pollution that cannot be prevented or recycled should be **treated** in an environmentally safe manner whenever feasible;
- **Disposal** or other **release** into the environment should be employed only as a last resort and should be conducted in an environmentally safe manner

CEQ guidance for incorporating pollution prevention into NEPA is available at, http://ceq.eh.doe.gov/nepa/regs/poll/ppguidnc.htm).

The Montana State University-Extension Service in Bozeman has initiated development of a Montana Pollution Prevention program to provide information to businesses and industries in Montana regarding waste reduction, pollution prevention, and recycling (see website http://www.montana.edu/wwwated/links.htm). We encourage you to contact Mr. Michael Vogel at the MSU-ES Pollution Prevention Program at (406) 994-3451 or at <mvogel@montana.edu> to seek new ideas and technology.

Appendix D:
Threatened and Endangered Species Lists

United States Department of the Interior

FISH AND WILDLIFE SERVICE
MONTANA FIELD OFFICE
585 Sheppard Way
HELENA, MT 59601
PHONE (406) 449-5225, FAX (406) 449-5339

ENDANGERED, THREATENED, PROPOSED AND CANDIDATE SPECIES MONTANA COUNTIES*

Endangered Species Act

August 2006

C = Candidate
LT = Listed Threatened
LE = Listed Endangered
PCH = Proposed Critical Habitat
CH = Designated Critical Habitat
XN = Experimental non-essential population

*Note: Generally, this list identifies the counties where one would reasonably expect the species to occur, not necessarily every county where the species is listed

County/Scientific Name	Common Name	Status
BEAVERHEAD		
Thymallus arcticus	Montana Arctic Grayling	C
Haliaeetus leucocephalus	Bald Eagle	LT
Ursus arctos horribilis	Grizzly Bear	LT
Spiranthes diluvialis	Ute Ladies' Tresses	LT
Canis lupus	Gray Wolf	XN
BIG HORN		
Haliaeetus leucocephalus	Bald Eagle	LT
Mustela nigripes	Black-footed Ferret	LE
BLAINE		
Scaphirhynchus albus	Pallid Sturgeon	LE
Haliaeetus leucocephalus	Bald Eagle	LT
Mustela nigripes	Black-footed Ferret	LE
BROADWATER		
Haliaeetus leucocephalus	Bald Eagle	LT
Canis lupus	Gray Wolf	XN
Spiranthes diluvialis	Ute Ladies' Tresses	LT
Lynx canadensis	Canada Lynx	LT
CARBON		
Haliaeetus leucocephalus	Bald Eagle	LT
Ursus arctos horribilis	Grizzly Bear	LT
Canis lupus	Gray Wolf	XN
Lynx canadensis	Canada Lynx	LT
Mustela nigripes	Black-footed Ferret	LE
CARTER		
Haliaeetus leucocephalus	Bald Eagle	LT

County/Scientific Name	Common Name	Status
Mustela nigripes	Black-footed Ferret	LE
CASCADE		
Haliaeetus leucocephalus	Bald Eagle	LT
Lynx canadensis	Canada Lynx	LT
CHOUTEAU		
Scaphirhynchus albus	Pallid Sturgeon	LE
Haliaeetus leucocephalus	Bald Eagle	LT
Mustela nigripes	Black-footed Ferret	LE
Lynx canadensis	Canada Lynx	LT
CUSTER		
Scaphirhynchus albus	Pallid Sturgeon	LE
Haliaeetus leucocephalus	Bald Eagle	LT
Sterna antillarum athalassos	Interior Least Tern	LE
Mustela nigripes	Black-footed Ferret	LE
Grus americana	Whooping Crane	LE
DANIELS		
Haliaeetus leucocephalus	Bald Eagle	LT
DAWSON		
Scaphirhynchus albus	Pallid Sturgeon	LE
Sterna antillarum athalassos	Interior Least Tern	LE
Haliaeetus leucocephalus	Bald Eagle	LT
Grus americana	Whooping Crane	LE
DEER LODGE		
Thymallus arcticus	Montana Arctic Grayling	C
Haliaeetus leucocephalus	Bald Eagle	LT
Canis lupus	Gray Wolf	LE, XN
Salvelinus confluentus	Bull Trout	LT, CH
FALLON		
Haliaeetus leucocephalus	Bald Eagle	LT
Grus americana	Whooping Crane	LE
FERGUS		
Scaphirhynchus albus	Pallid Sturgeon	LE
Haliaeetus leucocephalus	Bald Eagle	LT
Mustela nigripes	Black-footed Ferret	LE
Lynx canadensis	Canada Lynx	LT
FLATHEAD		
Salvelinus confluentus	Bull Trout	LT, CH
Haliaeetus leucocephalus	Bald Eagle	LT
Ursus arctos horribilis	Grizzly Bear	LT
Silene spaldingii	Spalding's Campion	LT
Canis lupus	Gray Wolf	LE
Lynx canadensis	Canada Lynx	LT, PCH
GALLATIN		
Haliaeetus leucocephalus	Bald Eagle	LT
Ursus arctos horribilis	Grizzly Bear	LT
Zaitzevia thermae	Warm Spring Zaitzevian Riffle Beetle	C
Spiranthes diluvialis	Ute Ladies' Tresses	LT
Canis lupus	Gray Wolf	XN
Lynx canadensis	Canada Lynx	LT
GARFIELD		

County/Scientific Name	Common Name	Status
Scaphirhynchus albus	Pallid Sturgeon	LE
Charadrius melodus	Piping Plover	LT, CH
Sterna antillarum athalassos	Interior Least Tern	LE
Haliaeetus leucocephalus	Bald Eagle	LT
Mustela nigripes	Black-footed Ferret	LE
GLACIER		
Haliaeetus leucocephalus	Bald Eagle	LT
Ursus arctos horribilis	Grizzly Bear	LT
Canis lupus	Gray Wolf	LE
Lynx canadensis	Canada Lynx	LT, PCH
Salvelinus confluentus	Bull Trout	LT, CH
Botrychium lineare	Slender Moonwort	C
GOLDEN VALLEY		
Haliaeetus leucocephalus	Bald Eagle	LT
Mustela nigripes	Black-footed Ferret	LE
Lynx canadensis	Canada Lynx	LT
GRANITE		
Haliaeetus leucocephalus	Bald Eagle	LT
Canis lupus	Gray Wolf	LE, XN
Lynx canadensis	Canada Lynx	LT, PCH
Salvelinus confluentus	Bull Trout	LT, CH
HILL		
Haliaeetus leucocephalus	Bald Eagle	LT
Mustela nigripes	Black-footed Ferret	LE
JEFFERSON		
Haliaeetus leucocephalus	Bald Eagle	LT
Spiranthes diluvialis	Ute Ladies' Tresses	LT
Canis lupus	Gray Wolf	LE, XN
Lynx canadensis	Canada Lynx	LT
Mustela nigripes	Black-footed Ferret	LE
JUDITH BASIN		
Haliaeetus leucocephalus	Bald Eagle	LT
Lynx canadensis	Canada Lynx	LT
LAKE		
Haliaeetus leucocephalus	Bald Eagle	LT
Ursus arctos horribilis	Grizzly Bear	LT
Howellia aquatilis	Water Howellia	LT
Silene spaldingii	Spalding's Campion	LT
Canis lupus	Gray Wolf	LE
Lynx canadensis	Canada Lynx	LT, PCH
Salvelinus confluentus	Bull Trout	LT, CH
Botrychium lineare	Slender Moonwort	C
LEWIS AND CLARK		
Haliaeetus leucocephalus	Bald Eagle	LT
Ursus arctos horribilis	Grizzly Bear	LT
Canis lupus	Gray Wolf	LE, XN
Lynx canadensis	Canada Lynx	LT, PCH
Salvelinus confluentus	Bull Trout	LT, CH
Mustela nigripes	Black-footed Ferret	LE
LIBERTY		

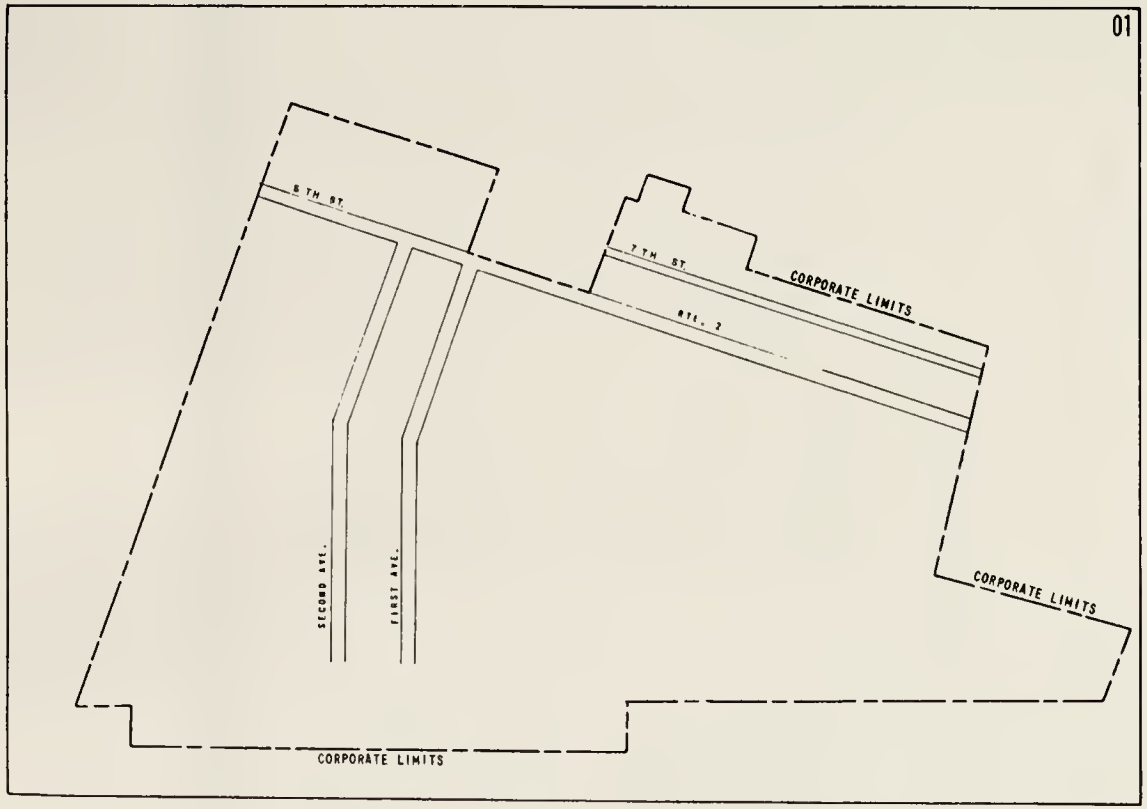
County/Scientific Name	Common Name	Status
Haliaeetus leucocephalus	Bald Eagle	LT
Mustela nigripes	Black-footed Ferret	LE
LINCOLN		
Acipenser transmontanus	White Sturgeon (Kootenai River Pop.)	LE
Haliaeetus leucocephalus	Bald Eagle	LT
Ursus arctos horribilis	Grizzly Bear	LT
Silene spaldingii	Spalding's Campion	LT
Canis lupus	Gray Wolf	LE
Lynx canadensis	Canada Lynx	LT, PCH
Salvelinus confluentus	Bull Trout	LT, CH
Howellia aquatilis	Water Howellia	LT
Botrychium lineare	Slender Moonwort	C
MADISON		
Haliaeetus leucocephalus	Bald Eagle	LT
Ursus arctos horribilis	Grizzly Bear	LT
Spiranthes diluvialis	Ute Ladies' Tresses	LT
Canis lupus	Gray Wolf	XN
Lynx canadensis	Canada Lynx	LT
McCONE		
Scaphirhynchus albus	Pallid Sturgeon	LE
Haliaeetus leucocephalus	Bald Eagle	LT
Charadrius melodus	Piping Plover	LT, CH
Sterna antillarum athalassos	Interior Least Tern	LE
Mustela nigripes	Black-footed Ferret	LE
Grus americana	Whooping Crane	LE
MEAGHER		
Haliaeetus leucocephalus	Bald Eagle	LT
Lynx canadensis	Canada Lynx	LT
MINERAL		
Haliaeetus leucocephalus	Bald Eagle	LT
Canis lupus	Gray Wolf	LE
Lynx canadensis	Canada Lynx	LT
Salvelinus confluentus	Bull Trout	LT, CH
MISSOULA		
Haliaeetus leucocephalus	Bald Eagle	LT
Ursus arctos horribilis	Grizzly Bear	LT
Howellia aquatilis	Water Howellia	LT
Canis lupus	Gray Wolf	LE, XN
Lynx canadensis	Canada Lynx	LT, PCH
Salvelinus confluentus	Bull Trout	LT, CH
Coccyzus americanus	Yellow-billed cuckoo (western pop.)	C
MUSSELSHELL		
Haliaeetus leucocephalus	Bald Eagle	LT
Mustela nigripes	Black-footed Ferret	LE
PARK		
Haliaeetus leucocephalus	Bald Eagle	LT
Ursus arctos horribilis	Grizzly Bear	LT
Canis lupus	Gray Wolf	XN
Lynx canadensis	Canada Lynx	LT
PETROLEUM		

County/Scientific Name	Common Name	Status
Scaphirhynchus albus	Pallid Sturgeon	LE
Haliaeetus leucocephalus	Bald Eagle	LT
Mustela nigripes	Black-footed Ferret	LE
PHILLIPS		
Scaphirhynchus albus	Pallid Sturgeon	LE
Haliaeetus leucocephalus	Bald Eagle	LT
Charadrius melodus	Piping Plover	LT, CH
Mustela nigripes	Black-footed Ferret	LE, XN
Grus americana	Whooping Crane	LE
PONDERA		
Charadrius melodus	Piping Plover	LT
Ursus arctos horribilis	Grizzly Bear	LT
Canis lupus	Gray Wolf	LE
Lynx canadensis	Canada Lynx	LT, PCH
Haliaeetus leucocephalus	Bald Eagle	LT
POWDER RIVER		
Haliaeetus leucocephalus	Bald Eagle	LT
Mustela nigripes	Black-footed Ferret	LE
POWELL		
Haliaeetus leucocephalus	Bald Eagle	LT
Ursus arctos horribilis	Grizzly Bear	LT
Canis lupus	Gray Wolf	LE, XN
Lynx canadensis	Canada Lynx	LT, PCH
Salvelinus confluentus	Bull Trout	LT, CH
PRAIRIE		
Scaphirhynchus albus	Pallid Sturgeon	LE
Sterna antillarum athalassos	Interior Least Tern	LE
Mustela nigripes	Black-footed Ferret	LE
Haliaeetus leucocephalus	Bald Eagle	LT
RAVALLI		
Haliaeetus leucocephalus	Bald Eagle	LT
Canis lupus	Gray Wolf	XN
Salvelinus confluentus	Bull Trout	LT, CH
Coccyzus americanus	Yellow-billed cuckoo (western pop.)	C
RICHLAND		
Scaphirhynchus albus	Pallid Sturgeon	LE
Haliaeetus leucocephalus	Bald Eagle	LT
Charadrius melodus	Piping Plover	LT, CH
Sterna antillarum athalassos	Interior Least Tern	LE
Grus americana	Whooping Crane	LE
ROOSEVELT		
Scaphirhynchus albus	Pallid Sturgeon	LE
Haliaeetus leucocephalus	Bald Eagle	LT
Charadrius melodus	Piping Plover	LT, CH
Sterna antillarum athalassos	Interior Least Tern	LE
Grus americana	Whooping Crane	LE
ROSEBUD		
Haliaeetus leucocephalus	Bald Eagle	LT
Mustela nigripes	Black-footed Ferret	LE
Sterna antillarum athalassos	Interior Least Tern	LE

County/Scientific Name	Common Name	Status
SANDERS		
Haliaeetus leucocephalus	Bald Eagle	LT
Ursus arctos horribilis	Grizzly Bear	LT
Canis lupus	Gray Wolf	LE
Lynx canadensis	Canada Lynx	LT
Salvelinus confluentus	Bull Trout	LT, CH
Botrychium lineare	Slender Moonwort	C
SHERIDAN		
Charadrius melodus	Piping Plover	LT, CH
Grus americana	Whooping Crane	LE
Haliaeetus leucocephalus	Bald Eagle	LT
SILVER BOW		
Thymallus arcticus	Montana Arctic Grayling	C
Haliaeetus leucocephalus	Bald Eagle	LT
Canis lupus	Gray Wolf	LE, XN
Salvelinus confluentus	Bull Trout	LT
STILLWATER		
Haliaeetus leucocephalus	Bald Eagle	LT
Ursus arctos horribilis	Grizzly Bear	LT
Canis lupus	Gray Wolf	XN
Lynx canadensis	Canada Lynx	LT
Mustela nigripes	Black-footed Ferret	LE
SWEET GRASS		
Haliaeetus leucocephalus	Bald Eagle	LT
Ursus arctos horribilis	Grizzly Bear	LT
Canis lupus	Gray Wolf	XN
Lynx canadensis	Canada Lynx	LT
Mustela nigripes	Black-footed Ferret	LE
TETON		
Haliaeetus leucocephalus	Bald Eagle	LT
Ursus arctos horribilis	Grizzly Bear	LT
Canis lupus	Gray Wolf	LE
Lynx canadensis	Canada Lynx	LT, PCH
TOOLE		
Haliaeetus leucocephalus	Bald Eagle	LT
Mustela nigripes	Black-footed Ferret	LE
TREASURE		
Haliaeetus leucocephalus	Bald Eagle	LT

County/Scientific Name	Common Name	Status
VALLEY		
Scaphirhynchus albus	Pallid Sturgeon	LE
Charadrius melodus	Piping Plover	LT, CH
Mustela nigripes	Black-footed Ferret	LE
Sterna antillarum athalassos	Interior Least Tern	LE
Haliaeetus leucocephalus	Bald Eagle	LT
Grus americana	Whooping Crane	LE
WHEATLAND		
Haliaeetus leucocephalus	Bald Eagle	LT
Mustela nigripes	Black-footed Ferret	LE
Lynx canadensis	Canada Lynx	LT
WIBAUX		
Haliaeetus leucocephalus	Bald Eagle	LT
Scaphirhynchus albus	Pallid Sturgeon	LE
Sterna antillarum athalassos	Interior Least Tern	LE
Grus americana	Whooping Crane	LE
YELLOWSTONE		
Haliaeetus leucocephalus	Bald Eagle	LT
Mustela nigripes	Black-footed Ferret	LE
Grus americana	Whooping Crane	LE

Appendix E:
FEMA Flood Map for Town of Culbertson



KEY TO MAP

Zone Designations	ZONE C
	ZONE A
	ZONE C
Elevation Reference Mark	RM7 x
Zone D Boundary	
River Mile	•MI 5

EXPLANATION OF ZONE DESIGNATIONS

ZONE	EXPLANATION
A	Areas of 100-year flood, base flood elevations and flood hazard factors not determined
B	Areas between limits of the 100-year flood and 500-year flood, or certain areas subject to 100-year flooding with average depths less than one (1) foot or where the contributing drainage area is less than one square mile, or areas protected by levees from the base flood
C	Areas of minimal flooding
D	Areas of undetermined, but possible, flood hazards
V	Areas of 100-year coastal flood with velocity (wave action), base flood elevations and flood hazard factors not determined

NOTES TO USER

INITIAL IDENTIFICATION
MARCH 29, 1974
FLOOD HAZARD BOUNDARY MAP REVISIONS
DECEMBER 19, 1975
FLOOD INSURANCE RATE MAP EFFECTIVE
MAY 15, 1986
FLOOD INSURANCE RATE MAP REVISIONS
NONE

To determine if flood insurance is available in this community contact your insurance agent, or call the National Flood Insurance Program, at (800) 638-6620

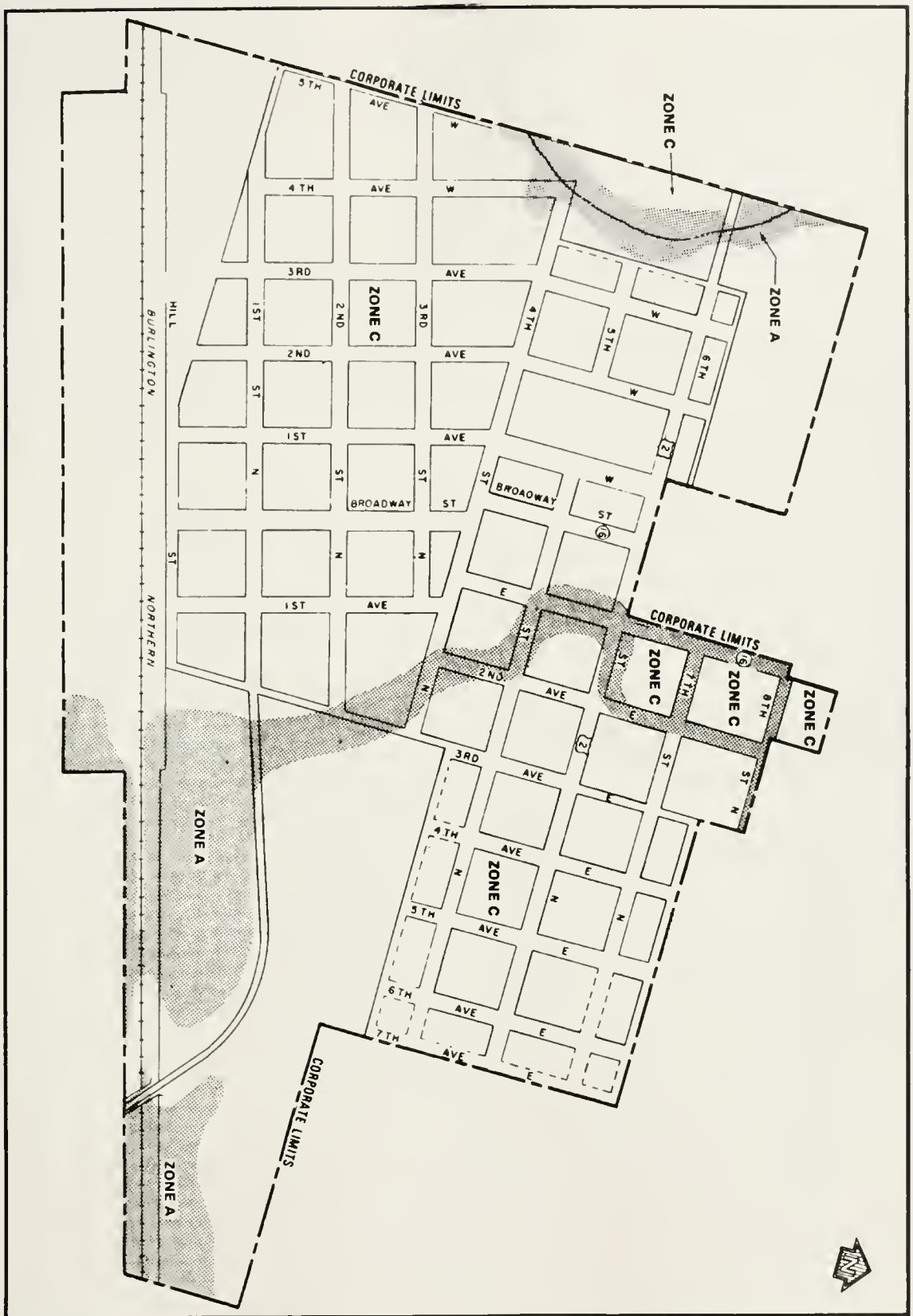
FEDERAL EMERGENCY MANAGEMENT AGENCY

FLOOD INSURANCE RATE MAP
PANEL(S) 01

MAP INDEX

TOWN OF CULBERTSON, MT
(ROOSEVELT CO.)

COMMUNITY NO. 300067 B



FEDERAL EMERGENCY MANAGEMENT AGENCY

TOWN OF CULBERTSON, MT
(ROOSEVELT CO.)

APPROXIMATE SCALE
250 0 500 1000 1500 FEET

FLOOD INSURANCE RATE MAP

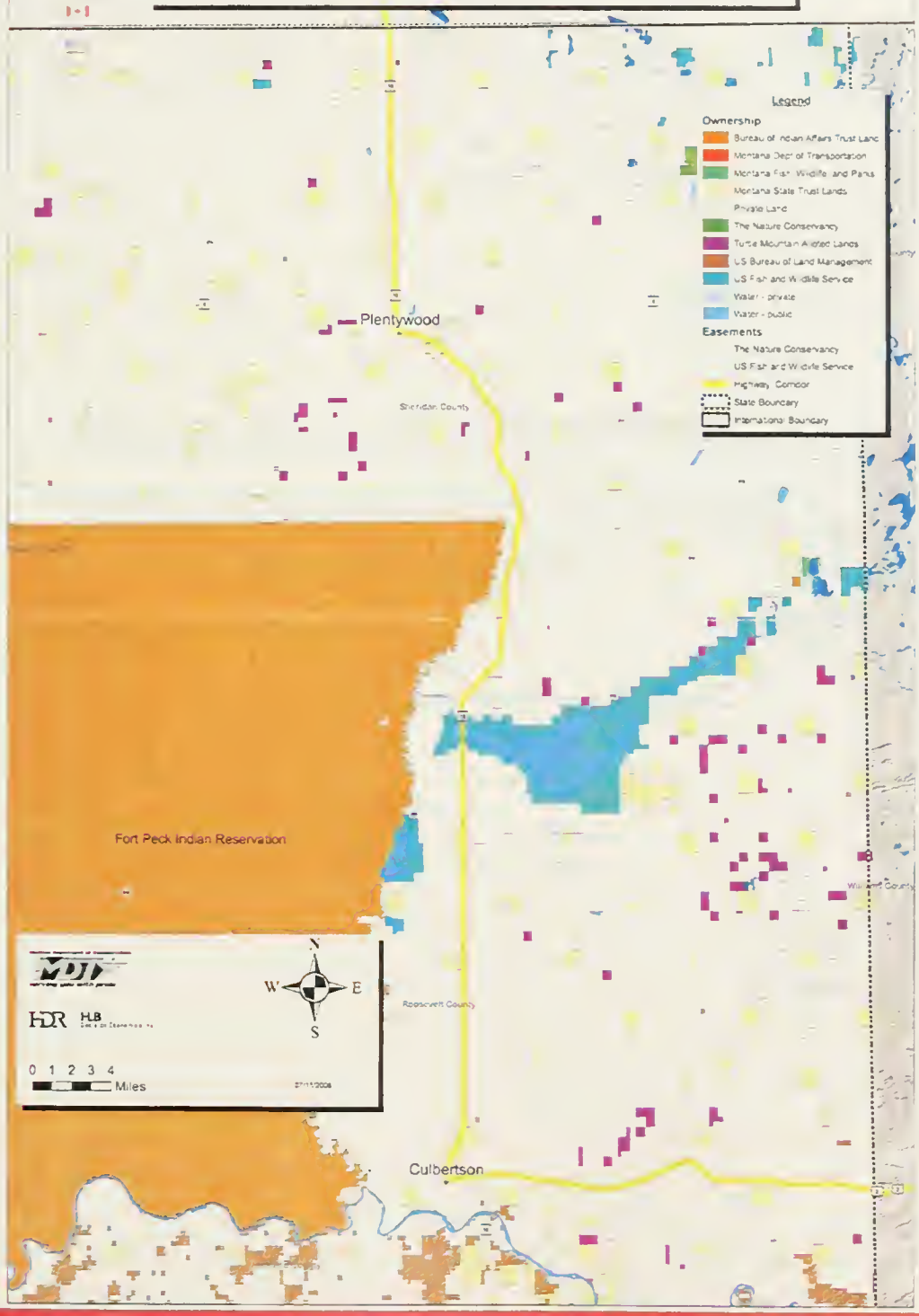
EFFECTIVE DATE:
MAY 15, 1988

01

Appendix F:
Public Ownership Display Map

TRANSPORTATION REGIONAL ECONOMIC DEVELOPMENT STUDY
THEODORE ROOSEVELT EXPRESSWAY

Study Area - Public Ownership



Frequently Asked Questions, Public Involvement Activities & Comments

Appendix G:
Public Involvement

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Purpose of the Document

This document's purpose is two-fold. First, this document presents a summary of the public involvement activities that took place during the course of the US 2 / MT 16 TRED Study. Secondly, this paper serves as a master document detailing the final comments received, any corresponding final report edits implemented, and the locations of any such edits within the final report.

TRED Public Involvement Activities

The study team involved interested parties and incorporated their advice into the design and report of the study. The following summarizes the public involvement efforts:

- **Site visits:** The study team maintained a consistent presence in the study region. Presence by the study team in the affected territory included visits by the Director (January 28), scoping tours (March 21-22), workshops (July 11, November 8) and expert meetings (July 12, August 15, November 8), environmental scan (August 1-2), Saskatchewan (May 16-17).

- **E-Access:** The project web site was maintained as a one-stop information source including draft documents, public presentations, newsletters, contact information, link to MDT comment system.

- **Expert advice:** An expert panel was formed to help refine and review the study. Three national experts were selected based on their expertise and national-scale perspective on the subject. Local representatives were chosen for their specific expertise in the key industries of agriculture, energy, tourism and general industry development. Both the national and local experts commented on the opportunity matrix, and helped refine the probabilities and traffic impacts of prospective developments. In addition, the panelists were thoroughly briefed on the study's overall process and findings and were asked to comment on it. The panel was convened July 11, August 15, and November 8, and comments were accepted from individual panelists throughout the project.

- **Local facilitation:** The Great Northern Development Corp. facilitated the study team's involvement efforts with the local populations by helping identify and make contact with community, business, and public leaders, and in assisting with on-site meetings.

- **Ground-level technical input:** 120 interviews conducted, May – July, 2006, with business leaders, academic experts, governmental agency leaders, and knowledgeable public stakeholders. Most of these interviews were with people in the immediate study area, but many were conducted at the larger regional scale.

- **Peer agency technical input:** Briefings with transportation agencies were held for states and provinces touching the TRE route. Primary contacts were established with each of the state and provincial peer agencies, and these contacts were periodically advised of the status of the project and asked to comment on it. Interviews were conducted with peer agencies in neighboring states and provinces concerning their future plans for highway projects connecting directly or indirectly with the TRE within Montana.

- **FHWA involvement:** MDT's federal peer agency was routinely engaged in project team meetings from pre-contracting through project completion. FHWA was

engaged in weekly briefings, monthly briefings, and all expert process and public meetings. Preliminary and final conclusions were vetted with FHWA, and it received documentation throughout the study. The agency has played a key advisory role.

- **Executive briefings:** Formal briefings for key agencies and interested-parties were held (March 23, September 13).

- **Resource agency involvement:** A workshop was held for resource agencies so they could understand and comment on the study and its potential relationship to federal environmental assessment processes. Comments were requested of the resource agencies on the environmental scan and draft study report.

- **Consultation with peer agencies from other states / provinces:** A briefing of peer agencies in other states was held on February 16, 2006. The study team conducted a site visit to Saskatchewan to learn more about that Province's dispositions regarding comparable improvements, and to gather private and institutional views as they informed this study. Also, a survey of state and provincial agencies along the TRE corridor was conducted to assess their situation with regard to potential improvements.

- **Public workshops:** Public workshops were held to brief local citizens on the project and to ask for citizen input. Those workshops were publicized through local advertising, press releases, and newsletters.

- **Press releases:** News announcements were distributed to regional and state press contacts on July 7, October 5, and November 22.

- **Newsletters:** Newsletters were sent to citizens interested in the process on June 30 and October 27.

- **Draft and comment:** The draft was distributed to resource agencies with a request for comment. The comment period lasted over 30 days. The complete draft was made available by web, CD, print, and local and state depository libraries).

Comments Received

FHWA Comments

Page ii - ....previous efforts to justify a four-lane expansion of rural segments of US 2.... If this is referring to the NEPA actions previously completed on US 2, we weren't trying to 'justify' a prior decision. We were analyzing alternatives to determine which met the purpose and need with the least impacts.

> Changed "previous efforts to justify a four-lane expansion" to "previous efforts failed to justify a four-lane expansion" and adjusted the syntax of the rest of the sentence.

Page v & vi - Key Findings, Item #1 Need to show how this conclusion relates to the 7 steps under Methodology & Framework. Item #2 four-lane configuration is expected to provide AN INCREMENTALLY safer corridor... Item #3 opportunities will have AN INCREMENTAL BENEFIT IN INCREASING THE likelihood of materializing...

> Item 1. The 7 steps are at WP3, page 9, and they deal with modeling methodology. Substituted text: "Ensuring continuity of design ... is important for future development of the corridor and its surrounding area."
>
> Added to both Item 2 and Item 3 "While considerable, these positive effects are not alone sufficient to warrant a four lane design."

Page vi – Strategic: Four-lane ensures true interconnectivity.....Two-lane cannot?

> Changed to "Strategic: Four-lane continuity ensures speed, safety, and consistent design through the northern TRE corridor by linking to a planned four-lane extension of US 2, west of Williston, ND to the Montana border. When completed, a four-lane US 2 will extend to Williston, then east through North Dakota and into Minnesota. Given unused capacity at the Port of Raymond and the growth of the region, four-lane continuity would strategically position the TRE corridor as a freight corridor and as a NAFTA corridor that handles long term growth."

Page x – Second bullet – Opportunities related to the agriculture and energy sectors in the region have AN INCREMENTAL BENEFIT of being realized with four-lane configurations that with two-lane configurations.

> The text is "...a higher likelihood..." which is accurate given the opportunity matrix probabilities in WP3 for both two-lane and four-lane scenarios.

Page x – Fourth bullet - The conclusion that we need a 4-lane to ensure system continuity may not get us very far since the entire corridor from Rapid City north is 2-lane (no projects started or underway for 4-lane construction.)

The text states that "four-lane continuity with adjoining segments of the TRE provides regional interconnectivity..." This refers to the US 2 section of the TRE in ND, which is planned to be four-laned to the Montana border, and is currently four-laned to Williston, a regional population center. Further regional interconnectivity would come from the additional sections of US 2 that are currently four-laned from Williston, east through North Dakota and into Minnesota. Text to this effect was added to page vi of this document.

Page xii – The first full paragraph should be modified to "The improvement of ~~US 2 from the Montana/North Dakota border to Culbertson~~ *the Theodore Roosevelt Expressway corridor in Montana* to four-lane divided standards would…."

Edited as suggested above.

Page xii – The executive Summary and Appendix A indicate that the use of $2 million in Federal-aid funds along with $310,000 in state funds to move forward with reconsideration of a four lane highway will not violate MCA 60-2-133 because it will not jeopardize any future highway project and MDT will continue to seek additional federal funds that do not require a state match. This is a different position and interpretation of MCA 60-2-133 than what the Department has taken in the past.

The US-2 Havre-Fort Belknap Final EIS, Chapter 4 for both the Four-Lane Undivided and Four-Lane Divided Alternatives states: "This alternative is consistent with the requirements of MCA 60-2-133 if MDT is successful in obtaining additional federal funding that does not require a state funding match needed for the additional costs to build the added lanes and the effort does not jeopardize other highway projects."

The US-2 Havre-Fort Belknap Record of Decision states: "As discussed in the Project Funding sections of Chapters 3 and 4 of the EIS, funding for the cost difference between four-lane and two-lane improvements must be federal funding that does not require state matching funds, per Montana Code Annotated (MCA) 60-2-133. Most federal highway money requires a state match, and therefore a special appropriation from Congress would be needed to fund the four-lane improvements. This type of funding is uncertain at this time. In contrast, the two-lane alternatives are eligible for several funding sources and therefore have more opportunity to be implemented in the near term. Cost and funding can affect the ability to implement a project, and therefore this information is disclosed in the EIS. The information on cost and funding, although important, is only one of many factors considered by FHWA and MDT in selecting a preferred alternative on any roadway project."

The funding discussion on Page xii of the Executive Summary is consistent with MCA 60-2-133 and the discussion about similar funding issues in the US 2 Havre to Fort Belknap Record of Decision and Environmental Impact Statement. If MDT decides to pursue improvement projects following the completion of this study, funding for the initial phases, including the environmental and design phases, would come from an existing US Highway 2 Federal earmark matched with State funds available to MDT that would not

jeopardize other highway projects. If the initial phases support a four-lane configuration, MDT will seek Federal funding that does not require non-Federal matching funds for the remaining phases including construction and construction engineering.

FHWA-Helena asked for the Department's further clarification regarding the legality of proceeding to programming the US 2 segment of the TRE, particularly in light of SB 3 (MCA 60-2-133). We made the following clarifying changes:

Executive Summary, p. xii, last para, was clarified as follows.

> ... If reconsideration is justified, the non-federal match is approximately $310,000. and would not jeopardize any future highway project, and thus would not violate MCA 60-2-133. MDT review of project design and planning workloads concludes that the project would not jeopardize any future highway project. MDT would also continue to seek additional federal funds that do not require a state funding math for future phases, including construction.

Summary & Conclusions, Appendix A, p 15-16, bottom para was clarified as follows:

> The statutory language associated with the potential four-laning of US 2 may be viewed as limiting restricts MDT's ability to use National Highway System (NHS) funds. This is because NHS funds are fully allocated to construction projects and forcing including a four-lane project into the future construction program would may appear to "jeopardize" another future highway projects, and thus FHWA asked if further steps could be viewed as consistent with violate MCA 60-2-133. MDT reviewed this issue and concluded that, should the department proceed to environmental assessment and preliminary engineering, that would be within the law. The uses of State matching funds would not jeopardize any future highway project, and that federal-aid highway funds have been earmarked specifically for review of a four-lane design in the area.
>
> The 2005 Safe Accountable & Flexible Transportation Efficiency Act-A Legacy for Users (SAFETEA-LU) included funding earmarks for US 2 improvements in Eastern Montana, shown in Table 2. These funds require a non-federal match of 13.42%. These earmarks are being allocated to the first eligible US 2 project moving into construction. These projects include full reconstructions of US 2 in the following areas: Bainville, Havre, Nashua, and Cut Bank. MDT has reserved $2 million from project #239 (see Table 2 below) to move forward into next steps on US 2, if the US 2/MT 16 TRED Study justifies augmenting already scheduled reconsideration of planned improvements on the US 2 segment of the Theodore Roosevelt Expressway corridor. If reconsideration is justified, the non-federal match is estimated at about $310,000 and would not jeopardize any future highway project. Should the project advance to detailed design and construction, MDT would also

continue to seek additional federal funds that do not require a state funding match for these future phases. We conclude that such action would be consistent with , and thus not violate MCA 60-2-133. MDT would also continue to seek additional federal funds that do not require a state funding match for future phases including construction. A letter to that effect is included in Appendix C.

For the sake of accuracy, we believe most of the traffic increases will be due to traffic being diverted from other parallel corridors. The TRED study uses "induced" traffic which is okay from the general definition of "induced" but probably not accurate against the traffic profession's definition of "induced."

Our modeling has shown that traffic will be generated from the economic effects of the corridor, and hence, is a true "induced" effect, not merely a diversion from existing routes. Thus HDR | HLB believes "induced" is used appropriately in this context.

Design consistency also is used in a context that differs from materials prepared by FHWA. In the context of FHWA materials, consistency applies to the match or mismatch of specific elements at a specific location. Example: 40' 2-lane highway with miles of straight road followed by a 30 mph curve.

Changed references to "design consistency" to "design continuity".

Recommend stating that both induced traffic and design consistency are being used in a different context.

Replaced "design consistency" as stated above.

Induced traffic is being used correctly, we believe. In our modeling, additional traffic effects are being generated by economic growth, thus the traffic is being induced to the region due to economic factors, not simply diverted from other roadways. Energy sector growth due to the region's oil reserves and the high world price of oil is triggering and will trigger increases in energy traffic (inducing the traffic to the area, not simply diverting it from other roadways). Correspondingly, the high price of oil is stimulating the growth in the agricultural sector through demand for ag-based fuels, such as ethanol, bio-diesel, and the resulting demand for those ag-inputs such as oil seed crops. These are a couple of the major drivers of the area's economy and reasons for the resulting traffic growth that the region is forecasted to experience.

Corps of Engineers Comments

The Corps of Engineers submitted a further letter in comment, which has been added to the Environmental Scan, Appendix C.

> To the Environmental Scan (section 3.3, p8, following paragraph 2 of that section), added:
>
> The federal Corps of Engineers (COE) notes that that agency is responsible to review transportation projects to ensure compliance with the federal Clean Water Act. The agency has permitting authority whenever highway projects intersect wetlands under its jurisdiction, and provides coordinated review by the federal Fish and Wildlife Service and others. Generally, COE may elect to use a simpler, national permit if (a) FHWA finds the project is categorically excluded from detailed NEPA review, or (b) if no wetland fill is proposed that exceeds 0.50 acres. Alternatively, the COE conducts a project specific analysis, and evaluates alternatives against its own assessment of project purpose and needs to identify the least environmentally damaging practicable alternative. The COE commented, "If MDT ultimately submits an alternative other than the least damaging practicable alternative for a permit, denial is the likely outcome." Therefore, if an individual permit is required by the COE, it would be important for MDT, FHWA, and COE to coordinate on the purpose and need statement, the identification of alternatives carried forward for further review and selection of the preferred alternative to ensure compatibility of the National Environmental Policy Act and Clean Water Act documents.

US Fish and Wildlife Service Comments

"Montana Highway 16 crosses through a portion of Medicine Lake National Wildlife Refuge. Increasing traffic volume and its attendant impacts to wildlife, and the risk of vehicle accidents and pollutant spills on the Refuge that may affect water quality are some aspects of the existing roadway that are of concern to the Service. Future improvements to that roadway that would widen or realign it through the Refuge would also be likely to affect adjacent habitats. Pursuant to section 4(f) of the U.S. Department of Transportation Act of 1966, coordination with Refuge staff would be required relative to these concerns and others that may become apparent if a project is proposed for this stretch of highway."

> In Environmental Scan, section 4.1.3 (page 32), paragraph 1, added:
>
> ... habitat for a vast array of wildlife. Improvements to the roadway that would widen or realign it through the Medicine Lake NWR would likely affect adjacent habitats. Pursuant to section 4(f) of the U.S. Department of Transportation Act of 1966, the U.S. Fish and Wildlife Service notes that coordination with Refuge staff would be required relative to these concerns and others that may become apparent if a project is proposed for this stretch of highway.

"At this time, the federally-listed threatened or endangered species that may occur in the vicinity of this project corridor are threatened piping plovers (Charadrius melodus), threatened bald eagles (Haliaeetus leucocephalus) and endangered whooping cranes (Grus americana). Critical habitat has been designated for piping plovers in some areas along the TRED study corridor, primarily shoreline habitats of Medicine Lake. Projects proposed by the Department in this area that may affect these species of designated critical habitat would require consultation with the Service pursuant to section 7 of the Endangered Species Act of 1973."

> These species and others are noted and discussed in the Environmental Scan section of the report (section 4.1.1.2, page 30). A specific discussion of the Medicine Lake National Wildlife Refuge is included, and that part, too, is consistent with the FWP comments (section 4.1.3, page 32)

"If a proposed project in this corridor may impact streams or wetlands, permits may eventually be required pursuant to section 404 of the Clean Water Act. In that event, depending on permit type and other factors, the Service may be required to review permit applications and will recommend any protection or mitigation measures to the U.S. Army Corps of Engineers as may appear reasonable and prudent based on the information available at that time."

> Response to this point is embodied in COE comment and response, elsewhere.

North Dakota Department of Transportation Comments

North Dakota Department of Transportation provided a letter in comment (see Environmental Scan, Appendix C), which states, in part:

"We do note an issue in the Executive Summary on page vi with respect to four lane continuity and regional interconnectivity. That section refers to the survey conducted on the future of the TRE Corridor with respect t neighboring states and their plans for future development of the corridor. That section states that ND is progressing toward four lane expansion of its portion of the TRE. The statement is not consistent with the comment that NDDOT had submitted to Montana in November 2006. At that time, NDDOT stated in response to the study survey that it currently has no plans to four-lane the US 85 segment of the Theodore Roosevelt Expressway. As per our phone conversations, MDT has modified that section to only reflect NDDOT's interest in a possible four-lane design on the US 2 segment of the TRE.

"In a similar survey question with respect to future plans of US 2, NDDOT indicated that while not having current plans to four lane US 2 from the Montana border east to the junction of US 85, North Dakota would reconsider that position and advance to developing a project for a 4-lane design should Montana advance to four lane US 2 at the Montana/North Dakota border.

"In addition to that discussion, NDDOT would like to point out that the study correctly states that transportation in the area is fairly seamless with respect to state boundaries. Based on that, when Montana DOT proceeds forward to environmental clearance for 4-laning the Montana portion of US 2 on its approach to the North Dakota border, NDDOT would like to discuss the possibility of merging efforts toward advancing future phases for corridor improvement."

> Executive Summary, page vi, paragraph "The study findings revealed..." was revised as follows:
>
> The study survey also found that some neighboring states, including North Dakota, are progressing toward four-lane expansion of their portions of the Theodore Roosevelt Expressway. In particular, NDDOT indicated that, while not having current plans relating to the US 85 segment of the TRE, NDDOT would advance to developing a project for a four lane road to the state border if Montana does so. Moreover, NDDOT and MDT are mutually disposed to coordinate efforts on future phases of improvements to the TRE corridor.

"On [Existing Conditions] page 89, paragraph 3, the authors state that most western Canadian provinces only allow 9-foot high vehicles."

> Existing Conditions, page 89, paragraph 3 was revised as follows:

... whereas most western Canadian provinces have somewhat more restrictive truck height limits. Saskatchewan, for instance, permits 4.15 meter (13.65 feet) heights. only allow 9-foot high vehicles.

Verbal comments from NDDOT also noted that information about cross-boundary regional economic integration of the area was covered too briefly in the Executive Summary, given the importance of intra-local traffic flows to the conclusions.

An expanded discussion of this was added by modifying Executive Summary, p. vi, section "Four Lane Continuity and Regional Interconnectivity" as follows:

The study findings revealed that the area shares many similarities with adjacent states and provinces that extend beyond political borders. The broader region is largely comprised of a comparable agriculture-based economy that is experiencing rapid expansion in the energy sector, and shares similar historical and cultural heritage. Owing to the rural character of the region and lack of larger trade centers in it, regional consumer trade and work-related traffic appears to flow quite readily across boundaries. Williston, North Dakota (pop. 12,200) is the nearest higher-order trade center to this part of Montana. Residents commonly travel interstate for consumer purchasing. Professional and financial services, too, are relatively concentrated in Williston, suggesting its central function for these services. Among major-order trade centers, Regina, Saskatchewan is by far the closest to the study region. If travel conditions improve, travel across the state and international borders can be expected to grow.

The study survey also found that some neighboring states, including North Dakota, are ...

Appendix A Comments

Since the cost estimates do not consider a realistic timeframe for construction or potential sources for funding, they probably are not accurate considering inflation, etc.

> The cost estimates provided are as accurate as they can be at this time. It is true we can't pinpoint the date of construction now, but this study's approach neither creates nor exacerbates the problem of estimating the construction timeframe at this level of planning. The approach used here is common practice.

EPA E-mail and Letter

From: Potts.Stephen@epamail.epa.gov [mailto:Potts.Stephen@epamail.epa.gov]
Sent: Wednesday, December 06, 2006 11:13 AM
To: Fossum, Hal
Subject: Re: Reminder: MDT TRED study comment period closes Dec. 7

I have not had time to review all of the Transportation Regional Economic Development (TRED) Study for the Theodore Roosevelt Expressway, and had difficulty opening some of the TRED Study files, but have read the Executive Summary, and the issues appear similar those involved in the proposal in 2004 to build a four lane highway on US 2 from Havre to Ft.
Belknap. EPA stated the following in its comments on the US 2 Havre to Ft. Belknap DEIS:

> "The EPA believes that the DEIS clearly shows that existing and future traffic volumes do not warrant a four-lane facility, and that the two-lane highway alternatives fulfill the project purpose and need, and that the two-lane alternatives have fewer adverse environmental impacts than the four-lane alternatives. In addition,
> the two-lane alternatives are substantially less costly, and an economic analysis referenced in the DEIS reports that capacity improvements to U.S. 2 are unlikely to induce development, and none of the alternatives would create substantial growth in the economy of
> the area. The four-lane alternatives, therefore, would offer no improvement to the regions economy and potential for future growth over the improved two-lane alternatives."

Without more detailed review of a specific highway project proposal and associated NEPA analysis we can only offer a very preliminary EPA perspective, but it appears that similar issues would be present for a proposal to build a four lane highway on MT 16 south from the Saskatchewan border and US 2 east of Culbertson as those encountered for
US 2 from Havre to Ft. Belknap. As EPA stated in its July 7, 2006 letter to Mr. Dick Turner of the Montana DOT (see copy attached below), the results of the environmental analysis for the US 2 Havre to Ft. Belknap project may offer implications and guidance for the proposed TRED Corridor Study for the Theodore Roosevelt Expressway.

(See attached file: TRED-CorridorStudy-ltr-7-06.doc) Stephen Potts, NEPA Coordinator EPA Region 8 Montana Office 10 West 15th St., Suite 3200 Helena, Montana 59626
Phone: 406-457-5022; FAX: 406-457-5055
At Missoula Forest Service Office: 406-329-3313
E-mail: potts.stephen@epa.gov

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION 8, MONTANA OFFICE

Ref: 8MO

July 7, 2006

Mr. Dick Turner, Chief, Multi-Modal Planning
Montana Dept. of Transportation
2701 Prospect Ave., P.O. Box 201001
Helena, MT 59620-1001

Re: EPA Comments on TRED Study Scan

Dear Mr. Turner:

The Environmental Protection Agency (EPA) Region VIII Montana Office was not able to attend the June 23, 2006 TRED Corridor Study environmental review session, however, we have received information on the TRED Study including a set of maps showing the proposed study area along Montana Highway 16 from the Canada border to the Port of Raymond to the intersection with US Highway 2 at Culbertson; and from that intersection east along US 2 to the North Dakota state line, and want to offer input in response to your request.

We have not reviewed the proposed TRED Study area in the field, and cannot at this time provide much site-specific guidance regarding environmental issues in the area, but we want to draw your attention to a document that we drafted entitled, *"Guidance/Measures to Reduce Environmental Impacts of Highway Projects"* (see copy attached). This document was drafted in association with interagency discussions for development of an improved ecosystem approach for transportation project development. It is intended to identify general environmental issues and concerns with highway projects, as well as potential mitigation measures to minimize and reduce impacts. Ms. Jean Riley, of the Montana Dept. of Transportation Environmental Services Bureau, has reviewed and offered input on this draft document. This document may be of interest and helpful in identifying environmental issues as you proceed with this TRED Corridor Study.

One of the more significant environmental issues is

likely to be potential impacts to aquatic areas, including wetlands, particularly if widening of the existing roadway to four lanes is proposed. As noted in our draft *Guidance,* Clean Water Act Section 404 Dredge and Fill Permit rules and policies require that adverse impacts to aquatic resources be avoided and minimized, and only the least environmentally damaging alternative to aquatic resources may be permitted, so long as that alternative does not have significant adverse environmental consequences (40 CFR 230.10a).

It will be important, therefore, for proposed highway improvements along Montana Highway 16 and US Highway 2 to avoid and minimize adverse impacts to aquatic resources. There may be potential concerns about development of a four lane highway in the proposed study area if aquatic areas would be adversely affected by highway expansion, and adverse effects were not justified by the project purpose and need. It is important that existing and future traffic volumes demonstrate a need for a four-lane highway to justify potential adverse impacts, and allow a Section 404 Dredge and Fill permit to be issued in conformance with regulatory requirements.

We note that when an EIS was prepared to evaluate alternative highway improvements along US Highway 2 east of Havre, Montana in 2004, it was found that the two-lane highway alternatives fulfilled the project purpose and need with fewer adverse environmental impacts than the four-lane alternatives. In addition, the two-lane alternatives were substantially less costly, and an economic analysis referenced in that EIS reported that capacity improvements to U.S. 2 were unlikely to induce development, and none of the alternatives would create substantial growth in the economy of the area. The four-lane alternatives, therefore, offered no improvement to the regions economy and potential for future growth over the improved two-lane alternatives, and would cost substantially more with greater environmental effects. These results may offer implications and guidance relevant to the proposed TRED Corridor Study.

If you have any questions or if we may provide further information regarding this project please contact Mr. Steve Potts of my staff in Helena at (406) 457-5022 or in Missoula at (406) 329-3313 or via e-mail at potts.stephen@epa.gov . Thank you for your consideration.

Sincerely,

John F. Wardell
Director
Montana Office

Enclosure

cc: Larry Svoboda/Julia Johnson, EPA, 8EPA-N, Denver
Allan Steinle/Todd Tillinger, COE, Helena

Corps of Engineers Response Letter

DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS, OMAHA DISTRICT
BILLINGS REGULATORY OFFICE
2602 FIRST AVENUE NORTH, ROOM 309
BILLINGS MT 59101

Please reply to attention of

December 5, 2006

RECEIVED
TRANSPORTATION PLANNING

Billings Regulatory Office
Phone (406) 657-5910
Fax (406) 657-5911

RE: US 2 / MT 16 TRED Study
Corps File No. 2006-244

Montana Department of Transportation
Attention: Mr. Hal Fossum
Post Office Box 201001
Helena, Montana 59620-1001

Dear Mr. Fossum:

Reference is made to your request for comments on the initial draft of the US 2 / MT 16 TRED Study. The Montana portion of the project extends from Port of Raymond, Montana, south to Culbertson, Montana, and east to the North Dakota state line.

Under the authority of Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act, Department of the Army permits are required for the discharge of fill material into waters of the United States. Waters of the United States include the area below the ordinary high water mark of stream channels and lakes or ponds connected to the tributary system, and wetlands adjacent to these waters.

Based on the information provided, the project area contains jurisdictional waters of the U.S., including wetlands. Wetlands along the project corridor will have to be delineated prior to any permitting or construction. However, we cannot determine at this time if an IP would be required for the 4-lane option. A condition that might require project review under IP procedures would be exceeding ½ acre of fill at any one crossing and/or filling of a jurisdictional water. If the project will be reviewed as an IP, it would be subject to 404(b)(1) guidelines review, which requires the least damaging practicable alternative in light of the overall project purpose as determined by the Corps.

When final design has been completed, please submit plans and a joint application to this office, along with project drawings and photographs of the proposed sites. Please also include an inventory of aquatic resources, including wetlands that may be affected by this project. The application can be downloaded from http://www.nwo.usace.army.mil/html/od-rmt/applications.html, or one can be mailed to you upon request. When the application is complete, a determination will be made as to whether or not authorization will be granted. The permit decision will be based on compliance with the guidelines and the Corps analysis may give different weight to some of the information that MDT used in deciding upon their preferred alternative.

If you have any questions, please call me at the Billings office at (406) 657-5910, and reference File No. 2006-244.

Sincerely,

Shannon Johnson
Project Manager

Printed on Recycled Paper

Expert Panelist Comments

Martin Weiss

Martin Weiss was concerned we are inferring that the "sound economic theory" applies to the connectivity / continuity discussion by using such language as significance, importance, etc. He feels this discussion is qualitative, not quantitative and would like the study to have wording reflecting this.

> Text has been added to the Executive Summary, page vi indicating that this connectivity/continuity discussion is based on qualitative interviews, it is not meant to infer that this argument arose from the economic modeling conducted.

Martin Weiss believes the Opportunities were too optimistic and did not reflect potential negatives.

> HDR | HLB believes that potential negatives were built into the analysis because of the ranges (10% and 90% intervals) and the probabilities attached to each opportunity. See footnote 1, WP#3, Page 3.

Bryan Richards, Expert Panelist, Yanke Group, Saskatoon, SK

Response to Exec Summary

My commentary is from Transport Company point of view.

Transport route drivers distance (miles) – shortest practical route is what is paid to drivers and what is cost customers. Excess miles are managed due to fuel expense and fuel taxes to be paid identified border crossings that allow above but based on viable truck routes and fueling opportunities

Safety – risk based on roads and weather

Assessing the TRED route and border crossing of Raymond is matched against mileage and routing settings of PC Miler version 20. Identifies a fairly narrow portion of the Midwest and South Central USA that would identify the "shortest practical route" as the path through Port of Raymond as opposed to Coutts, Sweetgrass, or Portal.

Positive situation going forward is the linkage between oil producing regions of Texas and Oklahoma and Alberta / Saskatchewan is strong for the near and distant future.

> Noted in WP#2 Page 28

Other Restrictions

Impact of Homeland Security initiatives post 9/11 – disallows "in transit" moves through the USA. Significantly reduced the use of US 2 / east to west / west to east.

This used to be a primary corridor now restricted. Overturning this restriction and/or providing another method of securement (GPS tracked seals on trailers) would allow significantly increased transport activity through this corridor.

Added to WP#2 Page 30

Supporting page vi / Regional Interconnectivity.

Regions with natural linkages are Alberta / Saskatchewan, oil producing regions and the oil producing regions of USA, Texas and Oklahoma.

Follow ups on WP#3

- Page 19, item 7
- Page 20, item 15/16
- Page 22, item 31, 32
- Page 23, item 35

Personal trip along Sask highway 6 south of Regina and visits to Port of Raymond, and across 39 to Port of Portal to review

1. Road quality and amenities
2. Port access and amenities
3. And distances and fuel opportunities

In terms of item 31 and 32 and 35, assessments made against the probabilities of growth given the 2 versus 4 lane corridor.

The Ports offer similar services and access in terms of hours of operations and active departments. Indications are that customs broker access is not a limiting factor nor is access to fuel and minimum services for washroom/eating.

By preference, discussions with our own drivers appeared to indicate no particular bias against use of Raymond, but equally, no particular additional desire to not use Portal.

Predominate factors of distance and wait times (although additional wait times at Portal did not appear to be a deterrent, as most border crossings, given distance traveled from key points of Minneapolis/Chicago/or further south or east occurred in the 2100 to 0700 time frame), are the key drivers for port / border crossing usage.

Note: Drivers that are Owner Operators (i.e. Purchase their own fuel, and pay their own maintenance and are only suggested to travel a specific route for service/transit times or risk related situations) show a preference for port of Raymond and would probably increasingly do so with road and amenities improvements.

Item 31 – no particular benefit noted, from our position, to potential changes presented, agree with projected volumes.

Item 32 – Mileage differences are the critical element but overall volume growth will be considerable and could expect much of that to be Owner Operator rather than company

owned units. Crossings expected to double and this is reflected in item 32 but expect that more will be Owner Operator and more will be in the oil and gas industry sector which leads to projection that larger share of the increase could be Raymond rather than Portal. Thereby, increase could be understated here by 25 %, i.e. Median could be 12 to 15.

Item 35 and 36 – concur with percentage increases in this area

Reference Points

Transportation Sector Outlook in Alberta – Future Outlook – Apr 2005, page 13 – "by 2013, traffic between USA and Alberta to double"

Export Development Canada – Saskatchewan exports to expand by

- energy – 29 % in 2006
- agri products 19 % in 2006 and 7 % in 2007
- coarse grains – 10 % in 2006, 4 % in 2007
- industrial goods 7 $ in 2007

Various interviews, straw polls taken with Operators

Review of Canadian CBSA and US Customer and Border Protection websites and stats

Personal visit to border areas

Knowledge and experience of 20 + yeas in transportation industry

Montana Department of Transportation

TRANSPORTATION REGIONAL ECONOMIC DEVELOPMENT

TRED

THEODORE ROOSEVELT EXPRESSWAY

Frequently Asked Questions & Public Comments

Final

Prepared by:

HDR | HLB Decision Economics Inc.

8403 Colesville Road, Suite 910
Silver Spring, Maryland 20910
Tel: (240) 485-2600
Fax: (240) 485-2635

April 2007

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1 INTRODUCTION

As an integral part of the study process, the Montana Department of Transportation accepted comments from all interested parties concerning the TRED corridor study. This document compiles the comments, both supportive of and in opposition to the project, received by MDT via mail, email, telephone, through MDT's TRED website, or in person.

Section 2 of this document presents a list of frequently asked questions about the study and supplies comprehensive responses to each.

Section 3 summarizes the public involvement efforts engaged in throughout the study process.

Section 4 contains an itemized archive of comments received, organized by content (supportive or in opposition) and by source. Comments made by governmental officials disclose the author's identity while general public comments do not reveal the comment's source for purposes of privacy.

2 FREQUENTLY ASKED QUESTIONS

US 2 / MT 16 TRED STUDY FAQ

1) ***I would rather see it (the expanded roadway) go through Glendive, Montana and Sidney, Montana than see it go to Williston, North Dakota. Williston will have Highway 2 for interstate in the future and Sidney needs this to help its development as a city.***

   The Theodore Roosevelt Expressway is a congressionally named corridor; it is because of this designation that this study was undertaken. However, this study and any possible resulting highway improvements do not preclude any further highway infrastructure improvements to the area. Additionally any highway improvements completed in the vicinity are also likely to benefit the entire region wherever these improvements may occur.

2) ***Is this going to be a four-lane highway and if so how is the state planning to cross the refuge at Medicine Lake?***

   This study was conducted to examine what conditions would warrant the expansion of the TRE corridor in Montana to a four lane highway. The final determination of whether any expansion occurs and what form that expansion could take will be dependent on several future considerations, including funding availability and environmental studies.

3) ***I oppose any rebuilding along this route that is not four-lane, so I am concerned about plans by MDT to improve portions of this highway corridor. Wouldn't construction of improved two-lane highways with passing lanes reduce the chances to later improve the corridor to four lanes?***

   MDT is seriously considering four-lane options for this corridor, but even in the best of circumstances, planning, engineering, funding, and constructing highway improvements takes many years. We cannot neglect pressing maintenance and safety issues in the meantime. MDT will proceed with construction of improvements already scheduled, which are vital to keeping the highway working well for the citizens and businesses in this area.

4) ***For those of us who own property along the route, when would we find out if part of our property would be needed for highway right-of-way?***

   Property owners will not be left out. This project is trying to determine if an expanded highway system is justified. At this point we don't know the exact location or timing of a highway expansion. When specific route options are

developed, MDT and FHWA will notify potentially affected property owners. At that time, you would be able to assess and weigh-in on specific alternatives.

5) ***Will this facility be converted to an Interstate?***

The federal Interstate building program ended in 1991. It would take an act of Congress to enact further Interstate expansion. There are no plans at this time to convert this facility to an access controlled facility such as an Interstate.

6) ***How much of the (Great Plains International Trade Corridor) is currently four lanes?***

About 25% of the Great Plains International Trade Corridor currently consists of four-lane highways.

7) ***All of this talk is focused on US 2, are you forgetting about MT 16?***

No. This study examined both the US 2 and the MT 16 portions of the Montana portion of the TRE corridor. If any expansion activity along this corridor is approved for expansion, the US 2 section appears to make the most sense to be the first segment. Being the first segment to receive expansion would not mean that the US 2 segment would be the only segment to be expanded.

8) ***Why is MDT building narrower roads than ND?***

Some highways in North Dakota may be wider, or narrower, than Montana's due to different classification, design standards, or age of roadways. States have authority not only to classify highways, but also to set design standards. States pursue renovation and improvement of highways on their own timelines. All these things make it difficult to compare one state's highways to others'.

9) ***Following the environmental documentation (next step), don't you have to program funding for a project?***

Yes. Funding is always a challenge. Arranging finances to complete any project is very important. MDT routinely takes preliminary steps to line up the funds, as we are in this case. The funding is an important, but distant challenge at this stage. The TRED study aims to determine if a project can be justified.

10) ***I am concerned about the NAFTA Superhighway. I've read that this highway expansion is being pushed by Canada, Mexico, and multinational corporations. Who initiated this project, and why?***

The so-called "NAFTA Superhighway" is located hundreds of miles from Montana, and it is wholly unrelated to this study. Improvements to the Theodore Roosevelt Expressway have been advocated by a grass roots effort of Montana

citizens. The TRED Study tends to bear out the long-held position of area citizens that there are local benefits of a four-lane design.

3 SUMMARY OF PUBLIC INVOLVEMENT EFFORTS

The study team involved interested parties and incorporated their advice into the design and report of the study. The following summarizes the public involvement efforts:

- **Site visits:** The study team maintained a consistent presence in the study region. Presence by the study team in the affected territory included visits by the Director (January 28), scoping tours (March 21-22), workshops (July 11, November 8) and expert meetings (July 12, August 15, November 8), environmental scan (August 1-2), Saskatchewan (May 16-17).

- **E-Access:** The project web site was maintained as a one-stop information source including draft documents, public presentations, newsletters, contact information, link to MDT comment system.

- **Expert advice:** An expert panel was formed to help refine and review the study. Three national experts were selected based on their expertise and national-scale perspective on the subject. Local representatives were chosen for their specific expertise in the key industries of agriculture, energy, tourism and general industry development. Both the national and local experts commented on the opportunity matrix, and helped refine the probabilities and traffic impacts of prospective developments. In addition, the panelists were thoroughly briefed on the study's overall process and findings and were asked to comment on it. The panel was convened July 11, August 15, and November 8, and comments were accepted from individual panelists throughout the project.

- **Local facilitation:** The Great Northern Development Corp. facilitated the study team's involvement efforts with the local populations by helping identify and make contact with community, business, and public leaders, and in assisting with on-site meetings.

- **Ground-level technical input:** 120 interviews conducted, May – July, 2006, with business leaders, academic experts, governmental agency leaders, and knowledgeable public stakeholders. Most of these interviews were with people in the immediate study area, but many were conducted at the larger regional scale.

- **Peer agency technical input:** Briefings with transportation agencies were held for states and provinces touching the TRE route. Primary contacts were established with each of the state and provincial peer agencies, and these contacts were periodically advised of the status of the project and asked to comment on it. Interviews were conducted with peer agencies in neighboring states and provinces concerning their future plans for highway projects connecting directly or indirectly with the TRE within Montana.

- **FHWA involvement:** MDT's federal peer agency was routinely engaged in project team meetings from pre-contracting through project completion. FHWA was

engaged in weekly briefings, monthly briefings, and all expert process and public meetings. Preliminary and final conclusions were vetted with FHWA, and it received documentation throughout the study. The agency has played a key advisory role.

- **Executive briefings:** Formal briefings for key agencies and interested-parties were held (March 23, September 13).

- **Resource agency involvement:** A workshop was held for resource agencies so they could understand and comment on the study and its potential relationship to federal environmental assessment processes. Comments were requested of the resource agencies on the environmental scan and draft study report.

- **Consultation with peer agencies from other states / provinces:** A briefing of peer agencies in other states was held on February 16, 2006. The study team conducted a site visit to Saskatchewan to learn more about that Province's dispositions regarding comparable improvements, and to gather private and institutional views as they informed this study. Also, a survey of state and provincial agencies along the TRE corridor was conducted to assess their situation with regard to potential improvements.

- **Public workshops:** Public workshops were held to brief local citizens on the project and to ask for citizen input. Those workshops were publicized through local advertising, press releases, and newsletters.

- **Press releases:** News announcements were distributed to regional and state press contacts on July 7, October 5, and November 22.

- **Newsletters:** Newsletters were sent to citizens interested in the process on June 30 and October 27.

- **Draft and comment:** The draft was distributed to resource agencies with a request for comment. The comment period lasted over 30 days. The complete draft was made available by web, CD, print, and local and state depository libraries).

4 PUBLIC COMMENTS

4.1 Comments in Support of the Study

Out of all the comments MDT received concerning the TRED study, a large proportion were supportive in nature, in fact, supportive comments outnumbered comments in opposition by almost a 10-1 margin. These positive comments are presented here.

Official supportive comments are presented first within this section followed by an itemized archive of the general public's positive comments.

4.1.1 Official Letters in Support

The text of a letter received by the Montana Department of Transportation in support of the TRE from the Sheridan County Commissioners follows.

> This is our letter of support for the US2/MT16 TRED project. The benefits to us in Northeast Montana will be immeasurable in the event this project is realized. We are seeing a marked increase in oil interest in Sheridan County, and that potential oil production coupled with the road project would bring greatly needed economic opportunities to our area.
>
> With our depressed agricultural economy, we see this road project as a vital part of the future survival of our communities here in Sheridan County. Please give this project your most serious consideration. We support it wholeheartedly.
>
> Sincerely,
>
> Gerald Kohler
> Chairman

4.1.2 Official Supportive Comments

Comments in support of the TRE Corridor expansion made by governmental officials are presented here.

The Sheridan County Chamber of Commerce serving Northeastern Montana fully support this project as a four lane highway from North Dakota/Montana through Montana/Saskatchewan borders. We support the Theodore Roosevelt Expressway and the entire Port to Plains Trade Corridor. This project would have a huge economic and tourism impact on the area. This project would be truly a positive from Sheridan County and the entire region.

Richard Rice, President, Sheridan County Chamber of Commerce and Agriculture

Hello:

We as commissioners and residents of NE Montana feel that the proposed US 2/MT16 project is extremely important to the future and survival of NE MT. It is probably as or more important as the current oil boom. It's hard to imagine the spin off of benefits of a project like this. Granted we really appreciate oil, but this opens a whole new set of conditions with our neighbors to the north. With the future development of Saskatchewan's oil and other products it is an ideal situation. I think we are on the brink of opportunity. You have our full and whole hearted support.

Thank You.

Gerald Kohler Chairman, Sheridan County Commissioner

I am very excited about the results of the draft TRED Study in regards to the Theodore Roosevelt Expressway. I agree with the study concerning the recommendation of a 4 lane highway on the Montana portion of this corridor. I feel this project will create economic opportunities for Northeastern Montana that would not be available with the current transportation infrastructure. This part of Montana needs the hope of increased development and economic opportunity that just might happen with this trade corridor between Mexico and Canada. I support this endeavor wholeheartedly and encourage the Montana Department of Transportation to move forward as quickly as possible to develop this project as a 4 lane highway system.

Sincerely yours,

William "Bill" Nyby, Sheridan County Commissioner

The Sheridan Commissioners appreciate the efforts of the MDT concerning the TRED Project. The Project has immense potential for NE Montana and at a recent public meeting there were no concerns of any downside to the project.

Bob Nikolaisen, Sheridan County Commissioner

4.1.3 General Public Supportive Comments

This section contains an itemized list of the general public comments received that were generally supportive of the TRE Corridor study.

1. Hello, we feel the proposed US 2 /MT 16 project is extremely important to NE Montana and the future transportation system in the United States. We feel that a good transportation system as well as our close proximity to Canada could definitely have a positive effect on economic development in NE Montana. We are located in the Williston basin where there is expanding oil and energy activity. With the new Conoco refinery development using the oil from the Alberta oil sands, the transportation needs will definitely increase. It is obvious that the transportation needs will drastically increase in the future.

2. I believe that the TRED project is extremely important to NE Montana. I am very much in favor of the project being completed. The project will benefit everyone in our area .It will help the farmers, truckers, tourists, business owners, and the general public.

3. The proposed US 2 / MT 16 project is very important to our area and the nation. Most importantly we need to have a drive-way from the Canadian border to the Mexican border. The best for the nation is to have this road in areas with the least traffic to make it safer for the border to border traffic. A continuous Divided 4 Lane from border to border will make for a safe appealing road for all transportation to take, therefore alleviating traffic thru overcrowded metro areas. In our local area the oil business has and will continue to increase. We feel the Divided 4 Lane proposed on the US 2 / MT 16 project will have safety and economic benefits for the Local Area, Nation and Continent.

4. This highway project is very important to Plentywood and the surrounding communities. This project will provide increased traffic safety and more jobs in the area. Those dollars will have a roll-over effect which will benefit all businesses, government agencies, and citizens in Montana. THIS PROJECT MUST MOVE FORWARD!

5. I am very much in favor of this highway project. I feel it is very important for northeastern Montana to have access to such a transportation system not only for current transportation needs but also for future economic development in this area.

6. I am very much in favor of this 4 lane highway. I feel it would help this area of Montana with economic development.

7. We the people in Plentywood Mt. feel the proposed us2/mt.16 project is very important to our community and the future transportation system in the United States. We know that a good transportation system as well as our close location to Canada could definitely have a positive effect on our economic development in NE Montana. With the growing oil activity in are area and Canada wanting to truck Alberta oil sands down here we will see a definite increase in traffic in the future along with all other trucking.

8. I am very much in favor of this 4 lane highway. I feel it would help this area of Montana with economic development.

9. Call from Redstone, MT to comment in favor of the TRED study. Also in favor of the 4 for 2 concept - "if they are going to blow the money anyway, we should get some safety out of it."

10. I would like to express my support for the TRED project. I believe this would be a great addition to Sheridan County and Plentywood.

11. I am in favor of the Theodore Roosevelt Expressway. I think this corridor hwy would be a great boom to eastern Montana. I believe with freight being ever increasingly hauled via trucks this would be a good addition to the nation's road system. Freight from Canada, including wheat and cattle, will do nothing but increase. Maybe this expressway would offset some of eastern Montana's economical decline caused from the decrease in family farms. I think the MDT should proceed with great idea.

12. I am for TRED. It would be positive for the economy of Montana.

13. We are very much in favor of this 4-lane highway being built.

14. Dear MDOT, I'm submitting comments on the TRED study. I'm a county planner in Plentywood and commute to work on Hwy 16 daily for the past 25 years. I've seen a great increase in truck traffic in the past 5 years due to increased oil activity and transport, as well as changes in agricultural transport where most grain is hauled longer distances by semis, so there is a substantial increase in that truck traffic as well. I support the TRED Study conclusion that Hwy 2 from ND to Culbertson should be a divided 4 lane highway. I don't think Hwy 16 has enough traffic yet to support a four lane but that option should be kept open as traffic loads increase in the future. Thank you for the opportunity to comment.

15. I am writing in reference to the proposed US 2 / MT 16 project. This highway project is very important to our area and to the United States. We definitely need a road from the Mexican Border to the Canadian Border. This proposed project work very well as it is best suited for areas with the least traffic to make it safer for border to border traffic. A continues Divided 4 Lane from border to border will make it safe and appealing for all traffic and transportation. This will also provide a much safer way of travel than through the large over crowded road. This project will provide a much needed economic benefits for our local area.

16. Telephoned to add their names to the list of people in support of this project.

17. In support of the project.

18. I am in favor of this road. It will give our community a boost!!

19. I am in favor of this 4 lane. I am a naturalized US citizen from Mexico and this road would be a benefit for future industry in this area.

20. I support the TRED for economic development. This project will greatly benefit the local economy and help us to begin to thrive financially.

21. This is the most import economical move since the 24 hour port at Regway. We strongly support it.

22. Caller from Antelope, MT called in support of TRED.

23. I am very much in favor of the proposed Theodore Roosevelt Expressway Project in Montana on Highways 2 and 16. I believe that a 4 lane highway through our area would greatly increase economic development in the area due to the increased traffic to Canada. I also believe that a 4 lane would result in fewer automobile accidents and automobile deer accidents. On 3 trips that we made to Denver in the past year, we saw many deer in the right-of -way of all the 2 lane highways but not many on the 4 lane highways.

24. I would like to express my interest in the TRED project. This is a very important key to the survival of this rural community. It would mean a great deal to the community as well as all the others along the way in NE MT and NW North Dakota. Please do whatever is needed to see that this project happens.

25. I am for US 2/MT 16 TRED. It will benefit our town greatly.

26. I would like to say it's about time! What a boost to Montana. With a four lane from Mexico to Canada and a four lane from North Dakota to Seattle the commerce of tourism and trade of goods will benefit this whole region. And having Plentywood and the Port of Raymond be the door to the North is awesome. No other city or Port on the High Line could be a better host. I am a

farmer and being a farmer having more options for marketing my crop is huge. I'm all in favor of this project and I mean that as a tax payer. We will do Montana proud having the door to Canada in far North East Montana. Thanks for giving me the opportunity to write to you.

27. The proposed highway project is an important one for our town and the area. We have a 24-hour port to Canada just north of Plentywood which is an asset for the new route, drawing traffic to and from Canada. Increased truck traffic would be beneficial to our local economy, and the possibility of increased tourism from the 4-lane highway would also benefit our area. We do have increased oil activity with many more trucks on the road, and a four-lane highway would greatly increase the safety factor for all involved. We feel this would be a great project to benefit all of us in northeastern Montana.

28. I am writing this note to let you know I support the US2/MT16 Project. I have been a resident of NE Montana all my life and any improvements to the highways in our area would certainly be a positive asset for commerce and safety. A 4-lane highway to the Canadian border would definitely mean safer travel for commercial trucks and cars since we have the different speed limits for each. Thank you for considering this important project for our area.

29. I want to express my support for the Theodore Roosevelt Expressway and the Great Plains Corridor. I feel this would increase economic development in Northeastern MT.

30. I am in favor of the Theodore Expressway and I think that it would greatly help with all the truck traffic.

31. I am in favor of the Theodore Roosevelt Expressway project, and really would like to see the north and south road come into being. There is a distinct probability that this highway would help the economy of Northeast Montana.

32. I am in support of the project as I have many times been behind a line of cars behind a truck or wide motor home. This creates a traffic danger. Also, I believe our area would greatly benefit from the economic boost of this expressway.

33. I am in full support of the development of TRED. I am a restaurant owner and a farmer. The benefits of other means of transporting ag products cannot be overstated. My restaurant business volume goes up with increased traffic such as during the summer months, and down during decreased traffic times such as now during winter. Right now my business is approx. 50% less than July.

34. I feel that the new highway is a great idea. Our highways around here narrow and are not very safe for high traffic, semi trucks, etc. It would be a lot safer if the roads to and from here were four lanes. It would make for make for safer travel in every aspect.

35. Dear Sirs: I have attended a local meeting in Plentywood, Mt concerning the Theodore Roosevelt Expressway. I am in favor of the project. I agree with the conclusions in the Executive Summary of the study of the TRED project. The additional factor of economic growth in an area not already subject to overcrowding and high costs makes sense to me.

36. I would like to express my positive opinion for the proposed US2/MT 16 for our community. As a long time employee and member of the local Chamber of Commerce, I feel the economic impact will help to promote other business opportunities for our area. By increasing the highway to 4 lanes, it will make it safer for the increased flow of traffic. We are already seeing a lot of truck traffic with the oil business which will continue to increase in the future. We are a major link to Canada and this corridor will help create more business between the two countries and on down to Mexico. With highway 16 connecting up to highway 2, the flow across the entire northern part of Montana will be beneficial to all.

37. Caller from Antelope, MT: In favor of the study's conclusions.

38. Caller from Plentywood, MT: In favor of the idea and project.

39. I am a small business owner in Plentywood. I favor expansion of HWY 16 into a for-lane to become the TRED. We are close to a 24 hour port into Canada and the expansion would be a boost to the declining economy in this area. Thank you.

40. I am definitely in favor of this trade corridor project. (TRED)

41. Yes, I am in favor of the US 2/MT16 TRED For economical reason.

42. As a realtor I get all kinds of comments. The most commented on is the roads. Yes, we need a four lane highway to help promote our area, and make traveling safer. We have a lot to offer. In my opinion we would see more tourism, hunting and maybe more retired people. I have had calls from people in the big cities wanting to move their family to a safe place, but the transportation was a problem. It may also be a possibility that we could get some industry if we had decent roads. Time is of essence to most.

43. I support the Theodore Roosevelt Expressway Project. I think the proposed Highway would be a great economic boost for this corner of the state.

44. I am in favor of the new highway from the port of Raymond to Culbertson and U.S. 2 from Culbertson to North Dakota border as segments of Theodore Roosevelt Expressway because of truck traffic. It will also be safer as far at traffic goes.

45. I live at Redstone Mt and feel that the 4 lane highway would be a great improvement to this area. It would help with the heavy truck traffic in the area as well as making the area better accessible for travelers.

46. I would like to express my positive opinion for the proposed US2/MT 16 for our community. As a long time employee and member of the local Chamber of Commerce, I feel the economic impact will help to promote other business opportunities for our area. By increasing the highway to 4 lanes, it will make it safer for the increased flow of traffic. We are already seeing a lot of truck traffic with the oil business which will continue to increase in the future. We are a major link to Canada and this corridor will help create more business between the two countries and on down to Mexico. With highway 16 connecting up to highway 2, the flow across the entire northern part of Montana will be beneficial to all.

47. Please help Eastern Montana's economy by making sure that this actually happens.

48. I think that the TRED project would be a very good thing for northeast Montana.

49. This project would really help our area as we try to promote economic development. There is a need for better highways in order for industries to consider a location in the Northeast corner of Montana. Without a good system of roads, we don't have much of a chance promoting ourselves. This project would create opportunities for agriculture, tourism, trucking, and the oil & other industries to expand in a safe way.

50. I feel the TRE would be a huge asset to our area. It would increase economic development and increase employment to our area. I also have a personal interest in this, as my husband does highway construction work too over the State. Most of his work takes him hundreds of miles away from home and this would be excellent in having him work at home. We are support this project strongly.

51. I am in favor of the expansion of US 16. I travel into Plentywood for work or spend the rest of my weeks on the road (1000-1500 miles a month in NE MT). I travel south to Culbertson to US 2, to Bainville or Poplar and also to Plentywood and on to Scobey. There is truck traffic during the entire year. It would be nice to have an expanded highway to keep the flow of traffic moving better. My mother lives in Billings, and my daughter and granddaughter will be moving there soon. It would be nice to have the traffic moving smoother as there are grain and beet trucks on the road many times when we travel that route. With an expanded highway there would be more opportunities for trade. We see many trucks moving north and south, to and from Canada, daily.

52. I think it would be a great improvement for the state and would help the local communities of eastern Montana immensely. Very much in favor.

53. I completely agree that the TRE Hwy and the Improvements to Hwy 2 absolutely have to happen. This is a reflection on the trade and everything in the area. I approve.

54. Support the TRE corridor.

55. Support the TRE corridor improvements.

56. I am in favor. I think this would benefit the economy in our area.

57. In favor. Would be a great asset to this community and, I believe, to everyone.

58. Very much in support of this project for economic development.

4.1.4 Petitions in Support of the Project

A petition in support of the TRE Corridor expansion received by MDT is reproduced below.

WE THE UNDERSIGNED SUPPORT THE RECOMMENDED DEVELOPMENT AND IMPROVEMENTS FOR THE TEDDY ROOSEVELT EXPRESSWAY PROPOSED PROJECT ON HWY 2 AND HWY 16 IN MONTANA:

Robert Mann – Plentywood, MT
Marilyn Mann – Plentywood, MT
Eda B. Smith – Dagmara MT
Dean W. Grover – Plentywood, MT.
Paula Hus – Plentywood MT
Gordon [illegible] – Plentywood MT
Alice Friedrich – Antelope MT
Don Friedrich – antelope mt.
Heidi Vazquez – Plentywood MT
Manuel Vazquez – Plentywood MT
Dale Thurtosh – Plentywood, MT
Melvin Hall – Plentywood, MT.
James Rice – Plentywood, mt.
Gerald Kohler – Raymond, mt.
Robert Nilsson – Plentywood, MT
Bob Friedrich – Antelope mt.
COLLEEN SORENSON – PLENTYWOOD, MT
Paul S. Dungeard – Plentywood, MT –
Gary R Nelson – Plentywood, MT
Helmer Lee – Plentywood, MT.
Sheila Lee – Plentywood, MT.
Joe Vistler – Plentywood, MT

4.2 Comments in Opposition to the Study

Not all the comments MDT received about this study were positive, however. Any comment that was generally in opposition or critical of this study follows from this point onward within this document.

4.2.1 General Public Letters in Opposition

The text of a letter in opposition to the TRE Corridor expansion sent by a concerned citizen and received by MDT follows.

> I was somewhat surprised to see the article on the Theodore Roosevelt Corridor in the Sunday, November 26, 2006 edition of the Tribune. I will be contacting Senator Max Baucus, Senator-elect John Tester, and Representative Dennis Rehberg regarding my opposition to this issue.
>
> I do not think the Tribune has done their research on this project. Maybe they should. The Agri-News, published in Billings, has featured many articles on this subject warning us of the underlying push for this road and the implications behind the road. My son in Minnesota found a great article on the Internet regarding this highway. I can assure you it is not to help the economies of a few counties in eastern Montana and North Dakota, although that is the way they are selling it to our communities. This corridor is starting in Mexico and going through to Canada. Some people are calling it the NAFTA Superhighway and our government and the governments of Canada and Mexico have secretly been planning this for years. Follow the money—see what multi-national corporations are behind this project and why.
>
> Who initiated this project? How does the Department of Transportation have the authority to make this decision? Supposedly you and your co-workers work for us (we the people). Who is giving you this authority? If our elected officials are in favor of this project, then who is padding their pockets? I would appreciate an answer to all of my questions as I am very concerned about the direction my Country is going.

4.2.2 General Public Opposition Comments

An itemized list of the comments opposing this study or its objectives received by MDT appears here.

1. This is a blatant waste of taxpayer dollars. Since when does widening a road improve the economy of agricultural based communities? Why is the current road not adequate again? The presence of a Flying J truck stop does not constitute economic development. I am against this project.

2. I am concerned about this project as it concerns Plentywood. The truck traffic has increased so much over the last several years and there is only one street to handle all this traffic. With this new proposed 4-lane highway the traffic will increase more. I think it is creating a unsafe traffic condition. The highway runs on First Avenue through Plentywood where there is a lot of residential homes. There are some other things happening that will also increase traffic in the future. With the increased oil activity and the proposed expansion of the elevator in Westby, this will put more heavy trucks through our town.

3. I am a trucker who does a lot of business shipping goods back & forth across the Canadian border. I'm concerned about some things I have read and heard about the development of this and similar corridors nationally. I'm not concerned about my business, but about the overall effects of corridors like this.

   We live right on Hwy 5 West. Any time you get a road, you get traffic, and that brings some nuisances. People stop in our yard at all hours of the day and night, some of them very poorly prepared for the climate and conditions here.

   The Kansas City Smart Port. Is it true that there is a central border & customs station being built in Kansas to enable through shipping by certain shippers & carriers? What is going on with this? If anything, we need to step up our border protection.

   The Texas project. Is it true that some part of this corridor is being developed as a private road by foreign investors? With all the taxes I pay to help support the highway system, I should not have to pay to use it. Why are we letting another country do this type of thing on US soil?

   I'm against this project if that's how it's going to be.

4. It seems to me that a 4-lane highway from North Dakota to Culbertson and north to the Port of Raymond serves too few people in Montana. It will mostly benefit North Dakota and Canada. US#2 really needs upgrading just east of Dodson and from Harlem to Havre and it seems a poor use of funds to do a four lane for such a small part of the State. There are over 20 wooden bridges between Harlem and Havre that need to be removed. Maybe a two lane with passing lanes would be

adequate. Please consider these solutions when deciding which way to go. Thank you.

5. Who is footing the bill for this thing? Seems like the major beneficiaries are Canada and Mexico. How do we propose to get their contributions to building it, maintaining it, and patrolling it? How are we going to pay for this, other than with my tax dollars? A main issue for me is the trafficking of illegal aliens and drugs. I have no problem with the people who come here legally and pay taxes like the rest of us, but we have to get serious about solving our problems with illegal traffic.

6. I think this is one of the stupidest things I've ever heard of. It makes the US a dumping place for all the illegals that want to come in from Mexico and Canada.

4.3 November 8, 2006 Open House Comments

Mark Sovig: We had a group from TX, CO, ND, and MT who went to Regina and met with their Chamber of Commerce, who is very supportive of this study. While supportive, most of their funding is Provincial. I think our improvements put pressure on them to improve their roads.

Sen. Kitzenberg: Do you realize the importance of the study if it doesn't happen? We have a commitment from ND to four lane to MT if MT does. If we don't improve, where does the traffic go? Will everything fall apart? I'm worried that an improved two lane will go in from ND to Bainville. Studies show that you get the economic development benefits from a four-lane, not a two-lane. I want this area to be like Shelby, where 2000 people/day travel to/from Canada.

Sen. Kitzenberg: Driving down here tonight, one issue from widening Glasgow to Nashua was that existing bridges could be utilized (for future 4 lane widening), I saw the contractor tearing down the existing bridge at Nashua. A widened two-lane is the "kiss of death." If it goes in at Bainville I don't think we will be able to get four lanes anywhere else on US 2.

Ed Smith: I served 8 years on the Transportation Commission. To think we can build two more lanes any time we want (in the future) is wrong. Where do we get the funding? How do we progress while still providing a safe system?

Bob Olson: For those of us who own property, when do we find out what right-of-way is needed? Will this facility be converted to an interstate?

Unknown: How much of the (Great Plains International Trade Corridor) is currently four lanes?

Unknown: The four-lane in SD to NE is scheduled to be complete by 2010.

Sen. Smith: I feel that passing lane sections are dangerous.

Mark Sovig: We appreciate your comments on connectivity. I think interstate and intrastate connectivity are very important pieces. Following the environmental documentation (next step), don't you have to program funding for a project?

Unknown: Diamond B trucking in Plentywood has recently doubled their operation (serving energy). All of this talk is focused on US 2, are you forgetting about MT 16? Why is MDT building narrower roads than ND?

Summary & Conclusions

Montana Department of Transportation

TRANSPORTATION REGIONAL ECONOMIC DEVELOPMENT

TRED

THEODORE ROOSEVELT EXPRESSWAY

Summary and Conclusions

Final

Prepared by:

Montana Department of Transportation

and

HDR | HLB Decision Economics Inc.

8403 Colesville Road, Suite 910
Silver Spring, Maryland 20910
Tel: (240) 485-2600
Fax: (240) 485-2635

April 2007

Summary & Conclusions

The US 2 / MT 16 TRED Study considered economic, regulatory, and operational changes that would result in traffic and safety conditions that would justify the expansion of the Montana section of the Theodore Roosevelt Expressway (TRE) to a four-lane highway.

Based on the results of this study, four key elements demonstrate a need for improvements for US 2 and MT 16: system continuity with adjoining highways; the importance of the corridor as part of the TRE and the local and regional economy; safety; and level of service. These items are discussed in more detail below.

Throughout the study process the importance of the TRED corridor was examined at three different geographic levels: local, regional, and national. The local level of the study area includes the Theodore Roosevelt Expressway in Montana which includes the area from the Montana/North Dakota border to Culbertson on US 2 and from Culbertson to the Canada/US border on MT 16, a distance of about 90 miles. The immediate study area includes Roosevelt and Sheridan Counties in northeast Montana. Exhibit 1 shows the immediate study area.

Exhibit 1. Study Area, Local Level

US 2 and MT 16 are two-lane highways on the National Highway Systems and the Theodore Roosevelt Expressway, which Congress named as a high-priority corridor in August of 2005.

Functionally, FHWA classifies US 2 and MT 16 as rural principal arterials. Montana has a posted speed limit for passenger vehicles of 70 miles per hour (mph) during the daylight hours and 65 mph at night. Trucks are limited to speeds of 60 mph during the daylight hours and 55 mph at night. The area along the highway is flat to rolling terrain and is primarily used for agriculture. Larger communities in the area include Culbertson and Plentywood.

Exhibit 2. Study Area, Regional Level

At the regional level, the US 2 and MT 16 sections of the Theodore Roosevelt Expressway are important because they provide regional connectivity and mobility with North Dakota and Saskatchewan. US 2 is the main east-west transportation corridor in northeast Montana and provides an important link for the communities in this area to larger urban areas in Montana and North Dakota. US 2 connects to north-south oriented MT 16 in the area which provides a connection to the international border and southern Saskatchewan. Some of the major metropolitan areas in the region include Great Falls and Billings in Montana, Williston in North Dakota, Rapid City in South Dakota, and Saskatoon and Regina in Canada, as illustrated in Exhibit 2, to the right.

On a national level, the study corridor affects the entire north central region of the United States and the southern area of Canada bordering Montana and North Dakota, as shown in Exhibit 3, below. In particular, the corridor affects travel and freight opportunities from Denver, Colorado and points south from Saskatchewan, Canada and from the West Coast to Minneapolis, Minnesota and beyond.

Exhibit 3. Study Area, National Level

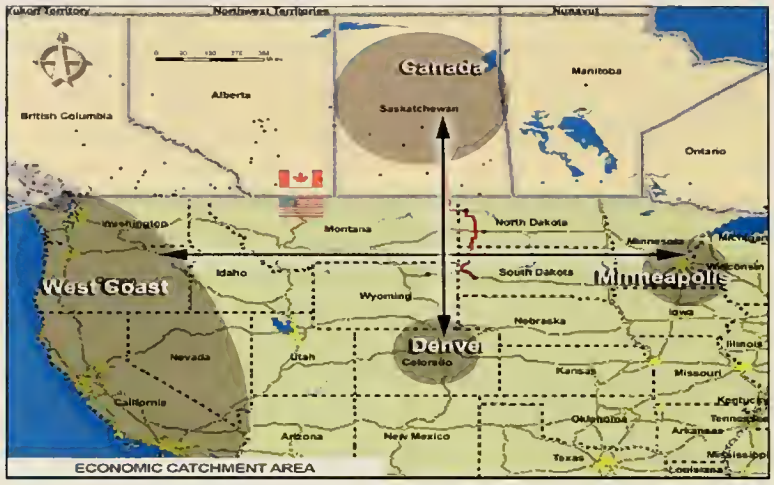
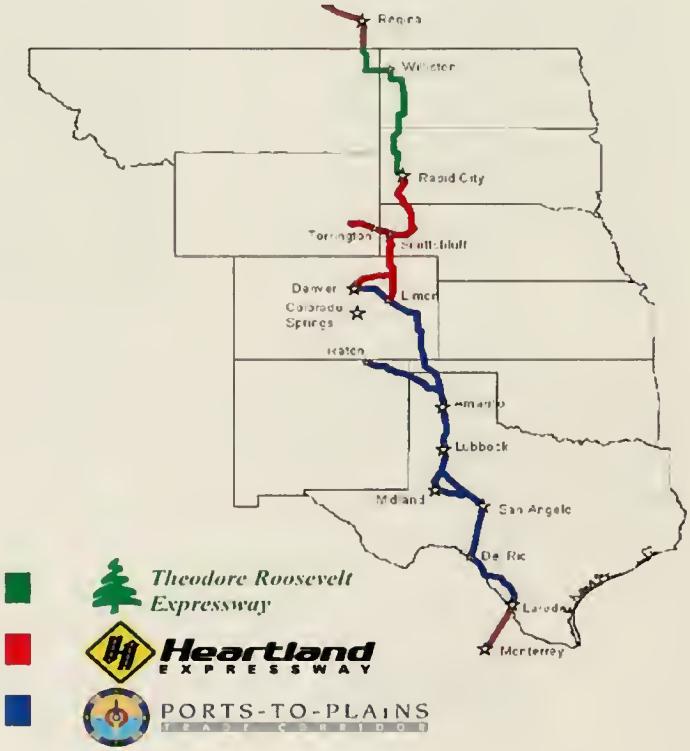


Exhibit 4. Great Plains International Trade Corridor



Importance of the Theodore Roosevelt Expressway

US 2 and MT 16 are also part of the Theodore Roosevelt Expressway, a segment of the Great Plains International Trade Corridor. The Great Plains Trade Corridor consists of three segments (Theodore Roosevelt Expressway, Heartland Expressway; and the Ports to Plains Trade Corridor) which extend from Laredo, Texas at the Mexican border to the Port of Raymond, Montana at the Canadian border, a distance of 2,236 miles (Exhibit 4).

The Theodore Roosevelt Expressway totals about 445 miles in South Dakota, North Dakota, and Montana and is considered a National Highway System High Priority Corridor. High priority corridors support trade and primarily long distance interstate and intrastate freight movement that results in high volumes of truck traffic (North Dakota Department of Transportation, 2005).

A high volume of truck traffic is already occurring on US 2 and MT 16 with about 7% to 13% of the traffic attributed to trucks. The truck volume on US 2 and MT 16 is expected to grow to 30% by 2036 compared to a Montana state average on all highways of 5 percent.

This study finds that, as the truck traffic increases, the time spent following trucks and other vehicles is expected to increase by up to 15% which could decrease travel speeds by 5 miles per hour on average.

Local and Regional Economic Importance

The quality of the TRE corridor is integral to the economic stability and growth futures of the area's people and communities. This corridor is the tie that binds the local communities with their broader economic setting, which extends into North Dakota and Canada. Both US 2 and MT 16 need to effectively and efficiently provide for the conveyance of goods, services, and people to connect and support the people and communities of the regional economy. The main economic components of the region are agriculture, energy, tourism, and retail trade.

Agriculture depends on truck transportation to move production from farms to transportation hubs and intermediate value-added processors. Demand for truck transportation services is expected to increase with growth and change in agricultural production. Overall growth in agricultural production of the area has been consistent and significant. Changing demand (e.g., increasing markets for healthy oils and grains), transportation practices (e.g., consolidation of grain-rail loading facilities into larger facilities), and local processing opportunities (e.g., oil-seed processing) all suggest higher demand for truck travel within the region. Transportation improvements could support business expansion and market access, as well as facilitate the hauling of products from farms to value-added processing plants. Opportunities in this sector include different crops (e.g., pulse and oilseed) and new value-added processing (e.g., oil processing and dairy). The remoteness of many production areas and the large distances agricultural products must be shipped are key challenges facing local producers and are also obstacles to cost-effective transportation. In sum, general growth and change in this sector suggests greater use of the highway corridor can be expected. Several substantial opportunities appear to rely on the quality of the highway corridor.

Energy development, particularly in oil, has grown significantly in recent years, and best estimates suggest that this growth trend will continue. Northeastern Montana is the largest oil exploration area in Montana, and much of the exploration activity is concentrated within the study area. The oil industry depends on the highway system to get workers, equipment, and supplies to the fields. While the transportation mode of choice for oil output is via pipeline, the pipelines in the study area are running at capacity, so much of the oil produced in the region must

be trucked to domestic refineries. With the high value of oil production and the resulting expected high growth in the oil industry within the study area over time, the oil industry is poised to reap transportation cost savings from highway expansion. Moreover, oil development in the Canadian provinces is very rapid, and the prospect of heavy infrastructure investments there is expected to generate significant through-traffic along the oil-corridor spanning from Texas through Colorado, Montana, and into the provinces. Energy development, in both local activity and industry movements through the region, are expected to place increasing demands on the highway corridor.

Tourism is significant in the area and has growth potential. The main strengths of the area tourism industry include hunting, which is strong in the shoulder and winter seasons, and Fort Peck Lake, the region's premier attraction during summer, the region's peak highway-use season. Other tourism attractions are developing. Most visitors traveling to the area are from neighboring states, and road infrastructure plays a critical role in attracting them. Local population is low and tourist attractions are widely dispersed in the state. In order to have visitorship growth in the area, the growth market in tourism is expected to be drawn from a wide radius, necessitating travel over long distances along Montana roadways. Especially because there are readily substitutable activities in the Plains area, the safety and attractiveness of the highway system for individuals traveling to and through the corridor are noted as significant factors in travel market growth. Although tourism is expected to have marginal effects on overall travel demand, highway improvements would have positive effects on this industry.

Local retail and service functions are served by urban hubs in Sidney, Plentywood, Culbertson, and Williston. Billings is the major higher-order trade center serving the region today while Regina is by far the largest and closest higher-order trade center, suggesting latent advantages to the local economy of improved linkages in that direction. Local and regional agriculture and energy businesses rely on US 2 and MT 16 to transport their products to rail heads and markets. Inter-local traffic, within the regional economy, is expected to come into increasing conflict with international traffic on the continental scale.

Because of the rural nature of the project area, the smaller communities rely on the larger towns to provide goods and services and use US 2 and MT 16 as the major connecting routes. The largest trade center in the region is Williston, North Dakota (population 12,200) on US 2 which is the region's main center for retail, professional, and financial services.

Overall, truck traffic as a percent of overall traffic is expected to reach 30% of total traffic volumes by 2036.

Many stakeholders in the region stated that new business were unwilling to locate to the area because of the lack of a high-capacity four-lane roadway to quickly and safely transport products. This study demonstrates that a four-lane design along the TRE corridor would, by 2036, increase total traffic on the corridor by about 17 percent over levels forecasted for the existing two-lane configuration.

While four lane highway design options provide greater local and regional economic benefits, those benefits alone do not appear to be large or certain enough to alone justify the selection of a four lane highway design. Certain two lane designs, such as an improved two-lane with passing lanes, could provide most of the same benefits.

System Continuity

The study findings revealed that the area shares many similarities with adjacent states and provinces that extend beyond political borders. The broader region is largely comprised of a comparable agriculture-based economy that is experiencing rapid expansion in the energy sector, and shares similar historical and cultural heritage. Owing to the rural character of the region and lack of larger trade centers in it, regional consumer trade and work-related traffic appears to flow quite readily across boundaries. Williston, North Dakota (pop. 12,200) is the nearest higher-order trade center to this part of Montana. Residents commonly travel interstate for consumer purchasing. Professional and financial services, too, are relatively concentrated in Williston, suggesting its central function for these services. Among major-order trade centers, Regina, Saskatchewan is by far the closest to the study region. If travel conditions improve, travel across the state and international borders can be expected to grow. The study survey also found that some neighboring states, including North Dakota, are progressing toward four-lane expansion of portions of the Theodore Roosevelt Expressway. In particular, NDDOT indicated that, while not having current plans relating to the US 85 segment of the TRE, NDDOT would advance to developing a project for a four lane road to the state border if Montana does so. Moreover, NDDOT and MDT are mutually disposed to coordinate efforts on future phases of improvements to the TRE corridor. The study, therefore, found that system continuity is critical from four main perspectives:

- Strategic: Four-lane continuity ensures speed, safety, and consistent design through the northern TRE corridor by linking to a planned four-lane extension of US 2, west of Williston, ND to the Montana border. When completed, a four-lane US 2 will extend to Williston, then east through North Dakota and into Minnesota. Given unused capacity at the Port of Raymond and the growth of the region, four-lane continuity would strategically position the TRE corridor as a freight corridor and as a NAFTA corridor that handles long term growth.
- Competitiveness: Four-lane continuity positions the corridor as a true alternative, and therefore a competitor, to other roadways in the region. The competitiveness of the corridor will be reflected in induced traffic demand and eventually increasing economic development. Furthermore the analysis found that the level of service in the corridor will continue to be good, making it an increasingly attractive alternative as other roadways and ports, such as the Port of Portal, get more congested. This increased competitiveness can function both as a north-south segment and as a link between the east and west regions.
- User Perception: Four-lane continuity would play a significant role in drivers' perception. Research in road pricing showed that driver's choice for roadway is based more on the

perceived level of service rather than the actual level of service. Accordingly, through the stakeholders interviews, we found that many perceived the existing roadway as less safe than the data shows and that they think that a four-lane roadway would provide safer travel and a better level of service for both personal vehicles and truck traffic. This perception should lead truck dispatchers as well as logistics and supply chains managers to make this corridor a segment of choice for their long-haul trucks in the region.

- Design Continuity: Four-lane continuity will also ensure design continuity and therefore a synergistic effect on traffic and freight growth along the corridor.

US 2 and MT 16 Accident Rates

MDT provided 2001-2005 Montana accident data for the Montana section of the TRE corridor as well as other comparable rural two-lane roadways. The sections of roadways used for comparison to US 2 and MT 16 outside the study area corridor were selected because they exhibit similar traffic volumes and have similar percentages of overall traffic composed of large trucks. Accident rates and fatality rates for overall traffic and for large trucks were calculated and appear in Table 1.

Table 1. Accident and Fatality Rates for Various Rural Two-Lane Montana Roadways 2001-2005 (Per 100 Million VMT)

Roadway Segment	Milepost Start	Milepost End	Description	Percent Trucks	Overall Accident Rate	Truck Accident Rate	Overall Fatality Rate
US 2	640	667	Culbertson to North Dakota Border	10.6%	152.5	113.6	3.4
MT 16	0	15.2	Saskatchewan Border to Plentywood	12.6%	24.5	77.5	0.0
MT 16	41	88.6	Plentywood to Culbertson	13.5%	90.5	93.3	2.1
US 2	260	640	West of Shelby to Culbertson	9.6%	105.9	85.1	2.9
MT 16	0	36.6	Culbertson to Sidney	12.1%	91.2	99.8	1.3
MT 3	3.5	46.7	Billings to Lavina	13.0%	69.3	76.2	2.3
MT 3	99	146	Harlowton to Lavina	19.1%	95.3	55.0	0.8

Shaded cell indicates US 2 and MT 16 segments being evaluated in the corridor study.

As can be seen in Table 1, the study area corridor's section of US 2 from Culbertson to the Montana/North Dakota state line has the highest accident rates, both for trucks alone and for overall vehicle traffic. The US 2 section of the study area corridor's accident rates are the highest of all the road segments examined and are much higher than those for the longer section of US 2

from Culbertson to just west of Shelby. Overall, the accident rate on the US 2 portion of the study area corridor is about 31% greater than the US 2 section from Culbertson to just west of Shelby that lies outside of the study area corridor. Moreover, the truck accident rate is 25% greater within the study area corridor than the US 2 section outside the corridor. It should also be noted that the truck accident rate on US 2 is higher than most of the other roadways evaluated even though the percentage of trucks that use the roadway is lower. These differences are very important and point to the conclusion that the segment of US 2 from Culbertson to the Montana/North Dakota state line performs poorly compared to other similar roadways within Montana with regards to safety.

In addition to accident rates, the fatality rate for US 2 from Culbertson to the North Dakota state line is 3.4 per 100 million vehicle miles traveled which is higher than the state average of 2.5 per 100 vehicle miles traveled and higher than any of the similar roadway segments shown in Table 1 above. MT 16 accident and fatality rates are lower than other comparable two-lane roads outside the project area.

Level of Service

Congestion levels are evaluated using a measure called level of service (LOS). Level of service is a method of measuring vehicle capacity on a highway. When the capacity of a highway is exceeded, this condition results in congestion and a poor level of service. On rural highways, lower levels of service mean that traffic tends to stack up behind slow moving vehicles. Predictable travel speeds decline and driver frustrations lead to more risks and accidents.

Table 2. Level of Service Criteria for Two-Lane Rural Principal Arterial

Level of Service (LOS)	Level of Service Definitions	Percent of Time Spent Following Other Vehicles	Average Vehicle Speed (mph)
A	Motorists can travel at their desired speed. No more than 35% of the time is spent following other vehicles.	35%	55
B	Average speed of 50–55 mph. Demand for passing is high. 50% of the time is spent following other vehicles.	35–50%	50–55
C	Average speed of 45–50 mph. Noticeable increase in following traffic with reduction in passing opportunities.	50–65%	45–50
D	Unstable traffic flow. Passing demand is high but passing opportunities approach zero. Vehicle following length of 5 to 10 vehicles and average speeds of 40–45 mph.	65–80%	40–45
E	Average speed below 40 mph. 80% of the time is spent following other vehicles. Passing is virtually impossible.	80%	40

LOS F applies whenever the number of vehicles traveling on the highway exceeds the roadway capacity. Source: Transportation Research Board 2000

Drivers that can do so choose alternate routes and local traffic may opt for back-roads while inter-regional traffic – trucks and visitors – may avoid the area altogether. Six levels of service ranging from A to F are used to define congestion and the operating conditions on roadways, with LOS A representing the best operating conditions (free-flowing traffic) and LOS F the worst operating conditions (extremely congested, stop-and-go traffic). For rural roadways such as US 2 and MT 16, level of service is based on the time spent following other vehicles. Table 2 illustrates level of service for a two-lane rural principal arterial according to highway capacity standards.

Planning Goals

According to Table 2 above, level of service on two-lane rural principal arterials is largely defined by speed and percent of time spent following other vehicles. As traffic levels increase, particularly through areas with grades and with the presence of trucks and heavy vehicles, the amount of time vehicles spend following other vehicles increases. Speeds begin to decline slightly, the freedom to maneuver within the traffic stream is more noticeably limited, and drivers often experience reduced physical and psychological comfort. This decrease in speed and increase in time spent following other vehicles leads to both a decreased level of service and a possible increase in accident rates as drivers seek opportunities to pass. Departments of transportation set goals for level of service for their roadways. For principal arterials in level to rolling terrain, such as US 2 and MT 16, MDT has set a level of service objective of LOS B.

Existing and Future Level of Service

The existing and future level of service analysis for this study used traffic volumes, peak-hour travel percentages, and directional split data, and also included truck and recreational vehicle (RV) percentages, road grades/slopes, percent of passing zones, base or free-flow travel speed, and lane and shoulder widths. One of the important factors on US 2 and MT 16 that decreases the level of service is that truck traffic is expected to grow from about 10% currently to about 30 % in 2036 as a result of increased regional freight movement and trade between Canada, the US, and Mexico. Table 3 illustrates the results of the analysis of existing (2006) and future (2036) level of service conditions.

Table 3. US 2 2006 and 2036 Level of Service, No-Action Alternative

Roadway Segment	LOS Guidelines	2006 LOS	2036 LOS
MT 16 – Port of Raymond to Plentywood	B	A	B
MT 16 – Plentywood to Culbertson	B	A	B
US 2 – Culbertson to Montana/North Dakota state line	B	A	B

Table 3 provides the level of service based on existing and 2036 No-Action Alternative conditions. As shown, the study segments of US 2 and MT 16 will still meet MDT Guidance of LOS B for a rural principal arterial. However, it should be noted that the decrease in level of

service from A to B[1] could reduce overall travel speeds by 5 miles per hour and increase the amount of time spent following trucks and other vehicles by 15%.

Environmental Impacts

This study includes an analysis of environmental issues in the study area that could influence future highway improvements. This analysis, as documented in the "Environmental Scan", indicates there are relatively few potential environmental issues along the corridor. However, based on a review of aerial photographs of communities along the corridor, there would be some impacts to commercial and residential properties with four-lane undivided improvement configurations. These impacts would have to be addressed in the development of future projects.

Conclusions

- Economic development may incrementally increase if the infrastructure expands from two-lanes to four-lanes.
- Opportunities related to the agriculture and energy sectors in the region have a higher likelihood of being realized with a four-lane configuration than with a two-lane configuration.
- An improved two-lane configuration would provide a reasonably adequate future level of service but would not address system continuity issues.
- Four-lane continuity with adjoining segments of the Theodore Roosevelt Expressway would provide regional interconnectivity by better positioning the corridor from the strategic, competitive, user expectation, and design continuity perspectives.
- With the estimated future 30% in truck traffic and the associated speed differential, a four-lane facility will help address passing conflicts throughout the segment.
- US 2 from Culbertson to the North Dakota state line has crash and severity rates that exceed statewide averages. Although improved two-lane configurations would improve safety, four-lane configurations would provide incrementally more safety benefits.
- As the corridor approaches the design year, the existing two-lane configuration will be approaching LOS "C" conditions. Four-lane configurations would maintain a higher level of service for a longer period.

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[1] According to MDT LOS calculations future LOS will be a low "B", almost reaching "C" level by 2036.

Relationship of Study Results to Future Improvements

Based on the results of this study, future improvements to the Montana segment of the Theodore Roosevelt Expressway should address the following primary purposes:

- Provide system continuity and roadway consistency with adjoining segments of the Theodore Roosevelt Expressway.
- Enhance the function of US 2 and MT 16 as a high priority corridor by improving travel conditions for long distance interstate and intrastate and international freight movement.
- Support economic growth in the multi-jurisdictional area.
- Improve the safety of the corridor.
- Address roadway design deficiencies to meet current MDT standards.

Following is an evaluation of potential highway improvement alternatives for the corridor based on their relationship to the above purposes:

- **Improved Two-Lane Highway** - Two travel 12 foot travel lanes with eight foot shoulders (in urban areas curb, gutter and sidewalk would be provided)
- **Improved Two-Lane with Passing Lanes Highway** – Two travel 12 foot travel lanes with eight foot shoulders (in urban areas curb, gutter and sidewalk would be provided). In passing lane areas an additional 12 foot travel lane would be provided.
- **Four-Lane Undivided Highway** – Four 12 foot travel lanes with eight foot shoulders (in urban areas curb, gutter and sidewalk would be provided).
- **Four-Lane Divided Highway** – Four 12 foot travel lanes, eight foot shoulders and a 35 foot median (in urban areas the median would be eliminated and curb, gutter and sidewalk would be provided)

Note: All alternatives assume use of the existing highway alignment including through communities due to Montana law that prohibits MDT from bypassing incorporated cities without the approval of the local government.

In Table 4 below, improvement alternatives were evaluated against the improvement purposes. As shown, only the four-lane alternatives meet all of the improvement purposes. The improvement of US 2 from the Montana/North Dakota border to Culbertson to four-lane divided standards would address the maximum number of improvement purposes and the improved two-lane alternative would address the minimum number of improvement purposes.

Table 4. US 2/MT 16 TRED Corridor Improvement Alternative Evaluation Summary

	Improvement Alternatives			
Improvement Purpose	Improved Two-Lane	Improved Two-Lane with Passing Lanes	Four-Lane Undivided	Four-Lane Divided
Provide system continuity and roadway consistency with adjoining segments of the Theodore Roosevelt Expressway.			√	√+
Enhance the function of US 2 and MT 16 as a high priority corridor by improving travel conditions for long distance interstate and intrastate and international freight movement.	√	√	√+	√+
Support economic growth in the multi-jurisdictional area.	√	√	√+	√+
Improve the safety of the corridor	√	√+	√+	√++
Address roadway design deficiencies to meet current MDT standards.	√	√	√	√

Cost Estimates and Financial Considerations

As shown in Appendix A, construction cost estimates for the two-lane and four-lane design configurations for the study corridor range from $179 million to $319 million. MDT has reserved $2 million from a SAFETEA-LU earmark to move forward into next steps on US 2 if the US 2/MT 16 TRED Study justifies reconsideration of planned improvements on the Theodore Roosevelt Expressway corridor. If reconsideration is justified, the non-federal match is approximately $310,000 and would not jeopardize any future highway project, and thus would not violate MCA 60-2-133. MDT would also continue to seek additional federal funds that do not require a state funding match for future phases including construction.

Appendix A: Cost Estimates for Corridor Improvements & Potential Funding Sources

Cost Estimates

MDT has one major reconstruction and widening project planned on the study corridor during the next five years. The Bainville East and West Project will reconstruct approximately 11 miles of US 2 from the North Dakota State Line to approximately three miles west of Bainville. The environmental analysis for the project supports an improved two-lane configuration with eight-foot shoulders, improved side slopes, and minor changes in alignment to improve safety. The estimated construction cost of the Bainville East and West Project is approximately $18.8 million with an additional $2.9 million in preliminary engineering, right-of-way, construction engineering, and incidental costs for a total cost of $20.7 million, or an average of $1.84 million per mile. This project was planned so an additional two lanes could be added in the future.

Although factors such as the number of structures and right-of-way costs could affect actual improvement costs, the estimated average costs per mile for the Bainville East and West Project provide a reasonable basis for estimating the costs for improving the remainder of the study corridor to similar two-lane standards as shown in the following table. Four-lane improvement costs are from the cost estimation module of MDT's Highway Economic Analysis Tool (HEAT). These estimates are summarized in Table 1. The costs in this table include construction, construction engineering, contingency, and right-of-way costs inflated out five years. Note that the cost estimates for the four lane alternatives assume the construction of a four-lane cross-section. In many locations, including the location of the Bainville East and West Project, it would be possible to add two lanes to the existing two lanes, depending on the condition of the roadway. Consequently, these costs are a high estimate. More detailed design work will be needed to determine where and if existing two-lane sections can serve as two lanes of a four lane cross-section.

These estimates also assume that within cities, the four-lane configuration would be undivided with curb, gutter, and sidewalks to reduce impacts on the communities. Under Montana law, local officials must approve any bypass of an incorporated community.

Table 1: Estimated Study Corridor Improvement Costs (Millions)

Segment	Two-Lane Improved	Four-Lane Undivided	Four-Lane Divided
US 2, ND State Line to Culbertson	$48	$77	$87
MT 16, Culbertson to Plentywood	$99	$154	$175
MT 16, Plentywood to Port of Raymond	$32	$50	$57
Total	$179	$281	$319

Potential Funding Sources

As part of the National Highway System, the primary source of funding for highway projects on the study corridor is Federal National Highway System funds, with the required 13% in State matching funds, provided to Montana annually. The Montana Transportation Commission directs these funds to eligible projects based on policy goals established in TranPlan 21, Montana's Federally-required statewide multimodal transportation plan, and MDT's Performance Programming Process, which ensures that funding decisions are consistent with overall system goals.

Funding decisions on the US 2 portion of the study corridor are also subject to the requirements of MCA 60-2-133, as amended by Senate Bill 3 in the 2001 Legislative Session. This statute directs MDT to "construct a four-lane highway generally along the present route of U.S. highway 2 from the North Dakota border to the Idaho border in order to increase tourism and to bring economic development to Montana." In addition, the statute directs that MDT "shall seek additional federal funding that does not require a state funding match for the U.S. highway 2 project." This statute also states that MDT may "not expend any resources on the U.S. highway 2 project that would jeopardize any future highway projects."

The statutory language associated with the potential four-laning of US 2 may be viewed as limiting MDT's ability to use National Highway System (NHS) funds. This is because NHS funds are fully allocated to construction projects and including a four-lane project into the future construction program may appear to "jeopardize" other future highway projects, and thus FHWA

asked if further steps could be viewed as consistent with MCA 60-2-133. MDT reviewed this issue and concluded that, should the department proceed to environmental assessment and preliminary engineering that would be within the law. The uses of State matching funds would not jeopardize any future highway project, and that federal-aid highway funds have been earmarked specifically for review of a four-lane design in the area.

The 2005 Safe Accountable & Flexible Transportation Efficiency Act-A Legacy for Users (SAFETEA-LU) included funding earmarks for US 2 improvements in Eastern Montana, shown in Table 2. These earmarks are being allocated to the first eligible US 2 project moving into construction. These projects include full reconstructions of US 2 in the following areas: Bainville, Havre, Nashua, and Cut Bank. MDT has reserved $2 million from project #239 (see Table 2 below) to move forward into next steps on US 2, if the US 2/MT 16 TRED Study justifies augmenting already scheduled improvements on the US 2 segment of the Theodore Roosevelt Expressway corridor. If reconsideration is justified, the non-federal match is estimated at about $310,000. Should the project advance to detailed design and construction, MDT would also continue to seek additional federal funds that do not require a state funding match for these future phases. We conclude that such action would be consistent with MCA 60-2-133. A letter to that effect is included in Environmental Scan, Appendix C.

Table 2: SAFETEA-LU Directed Funding for US 2

Section 1702
High Priority Projects

No.	State	Project Description	Amount
4417	MT	Transportation improvements for Havre--East Project, including Glasgow to Poplar, U.S. 2	$10,000,000
4420	MT	U.S. 2 transportation improvement projects between North Dakota State line and Browning	$20,000,000

Section 1934
Transportation Improvement Projects

No.	State	Project Description	Amount
239	MT	U.S. 2, corridor feasibility study, environmental review and construction, which may include construction of a 4-lane highway, for roadway sections from Glasgow east to the North Dakota State line, provided that all currently programmed highway improvement projects move forward	$10,000,000